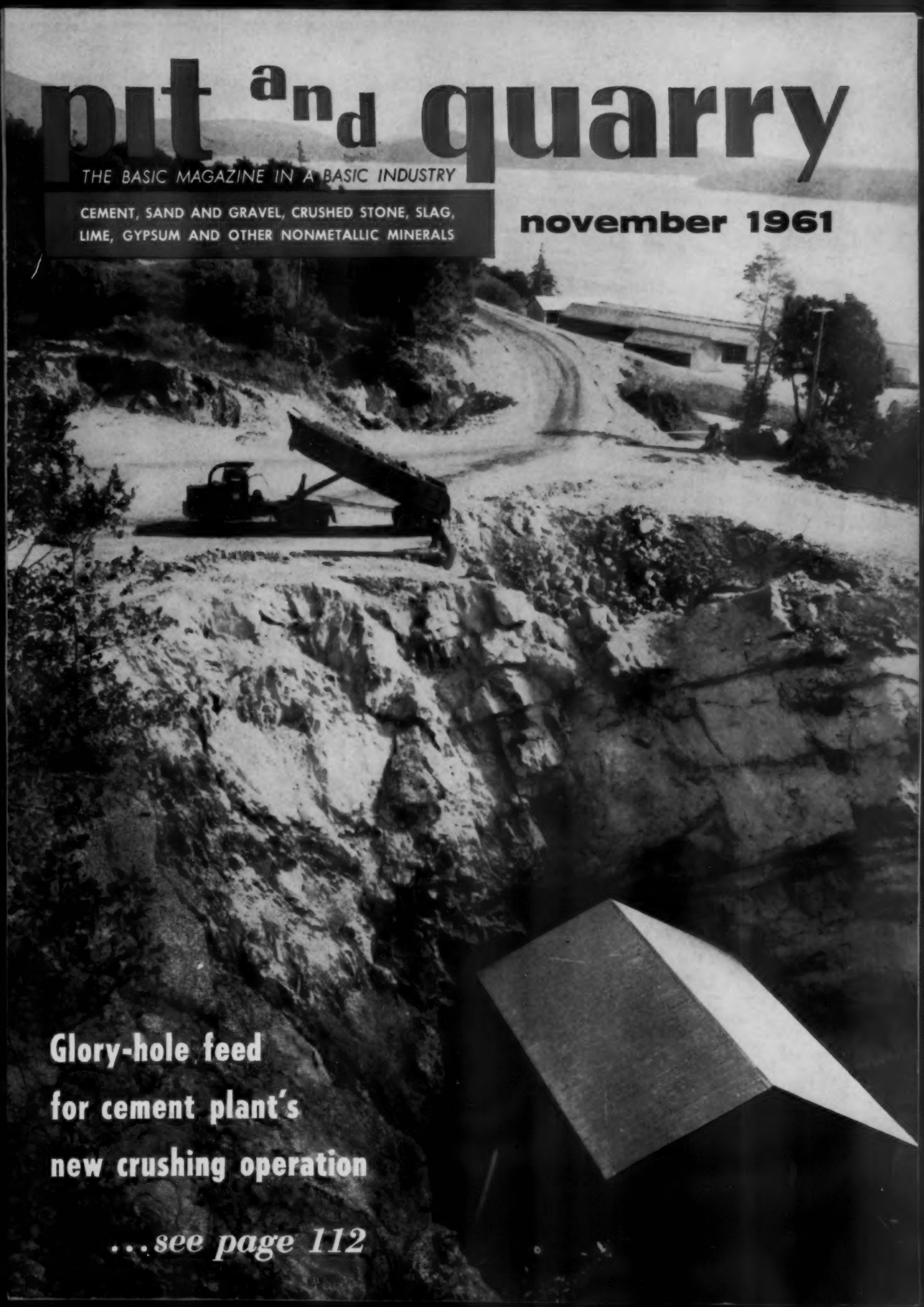
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

CEMENT, SAND AND GRAVEL, CRUSHED STONE, SLAG, LIME, GYPSUM AND OTHER NONMETALLIC MINERALS

november 1961



Glory-hole feed for cement plant's new crushing operation

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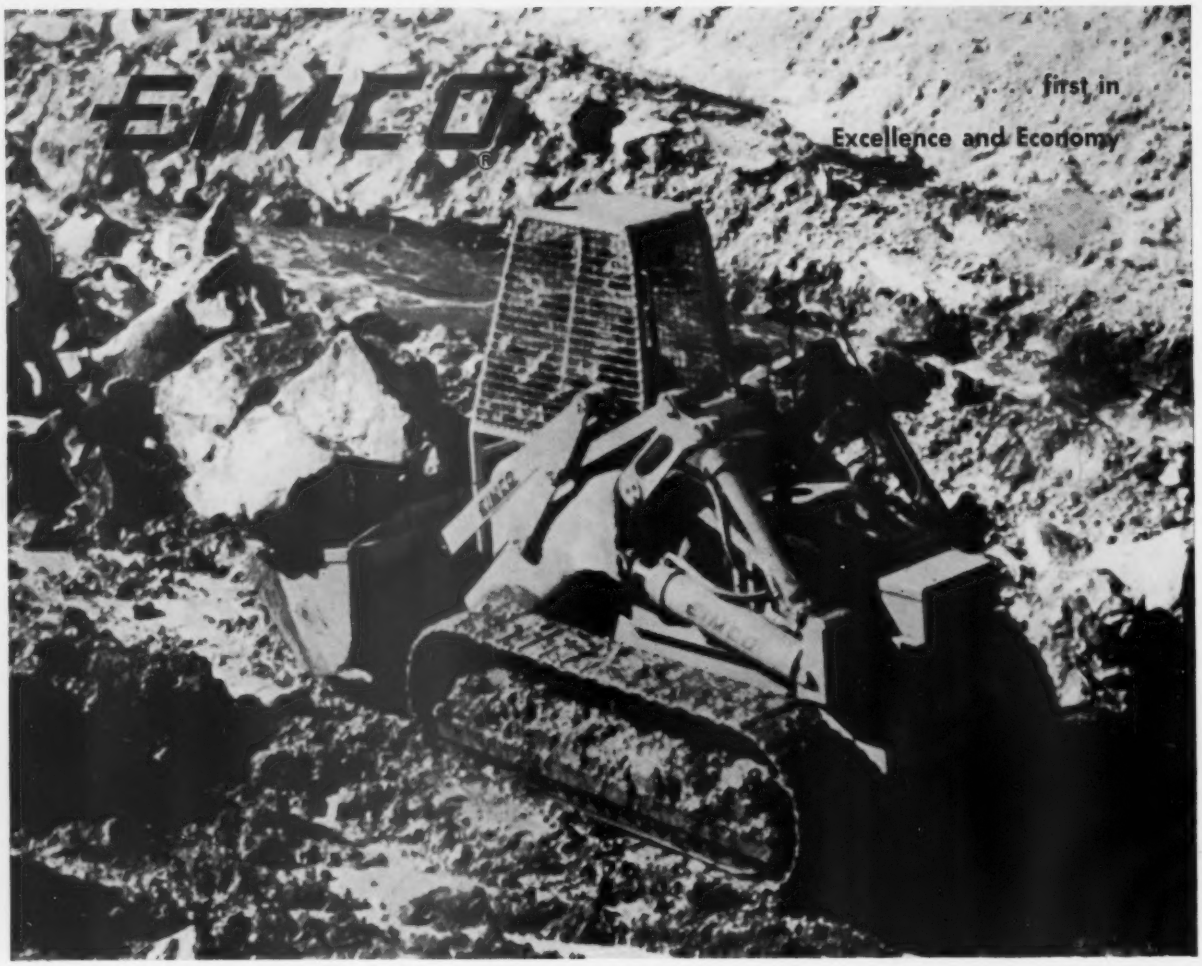

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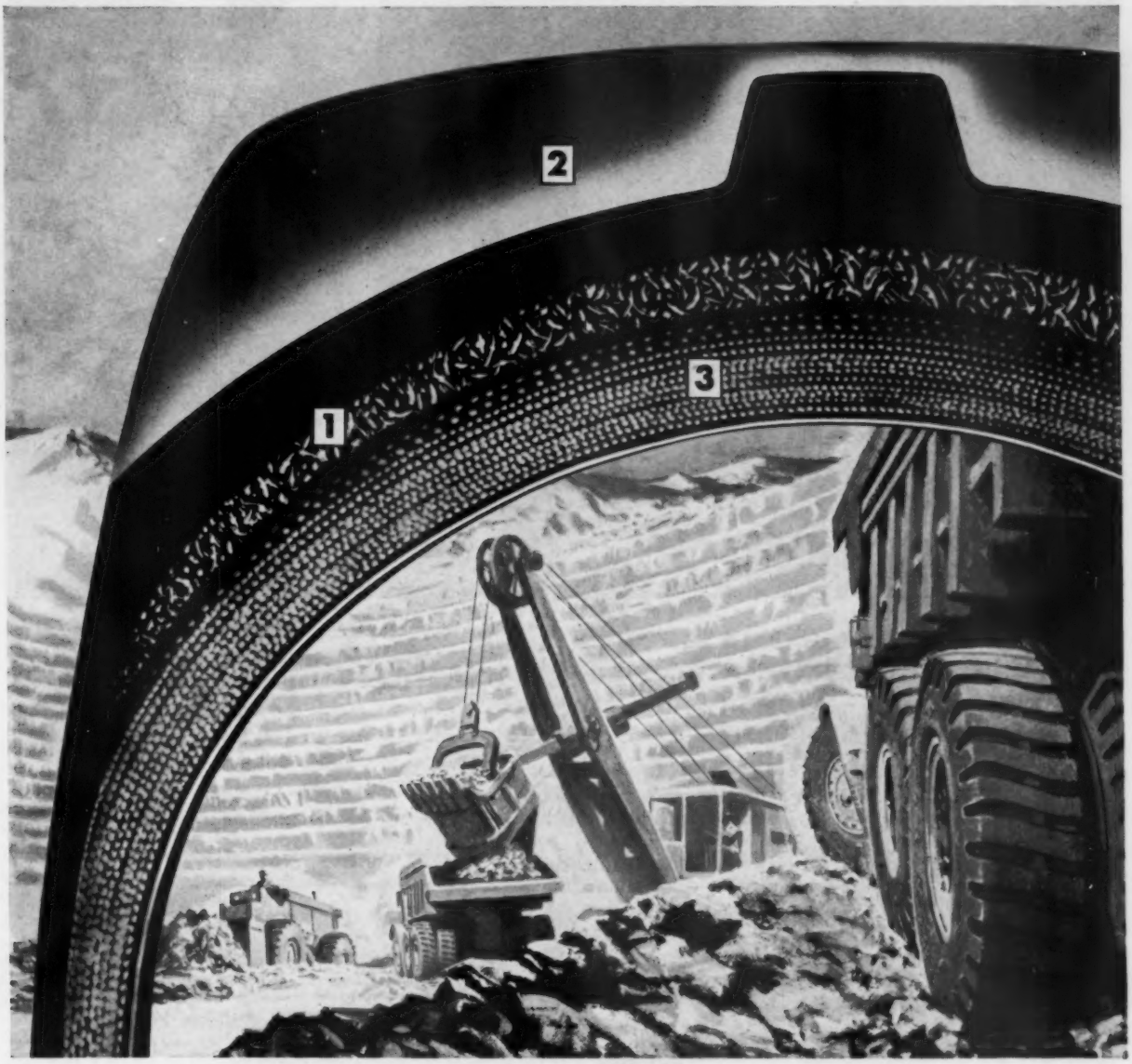

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PIT and QUARRY

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✓ *Indicates a* PIT AND QUARRY *staff-written report*

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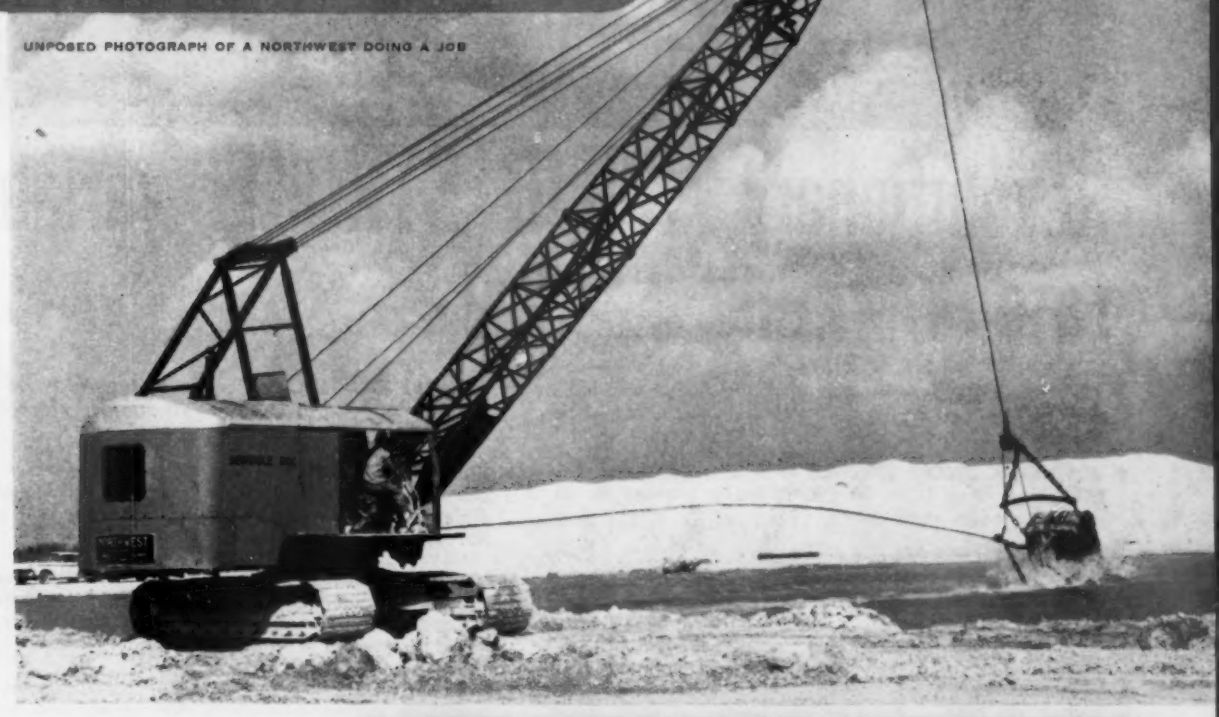

UNPOSED PHOTOGRAPH OF A NORTHWEST DOING A JOB

D-95-17-S

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3/4 to 4 1/2
Cubic Yard Capacity

NORTHWEST

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PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	25-Ton and 45-Ton Capacity

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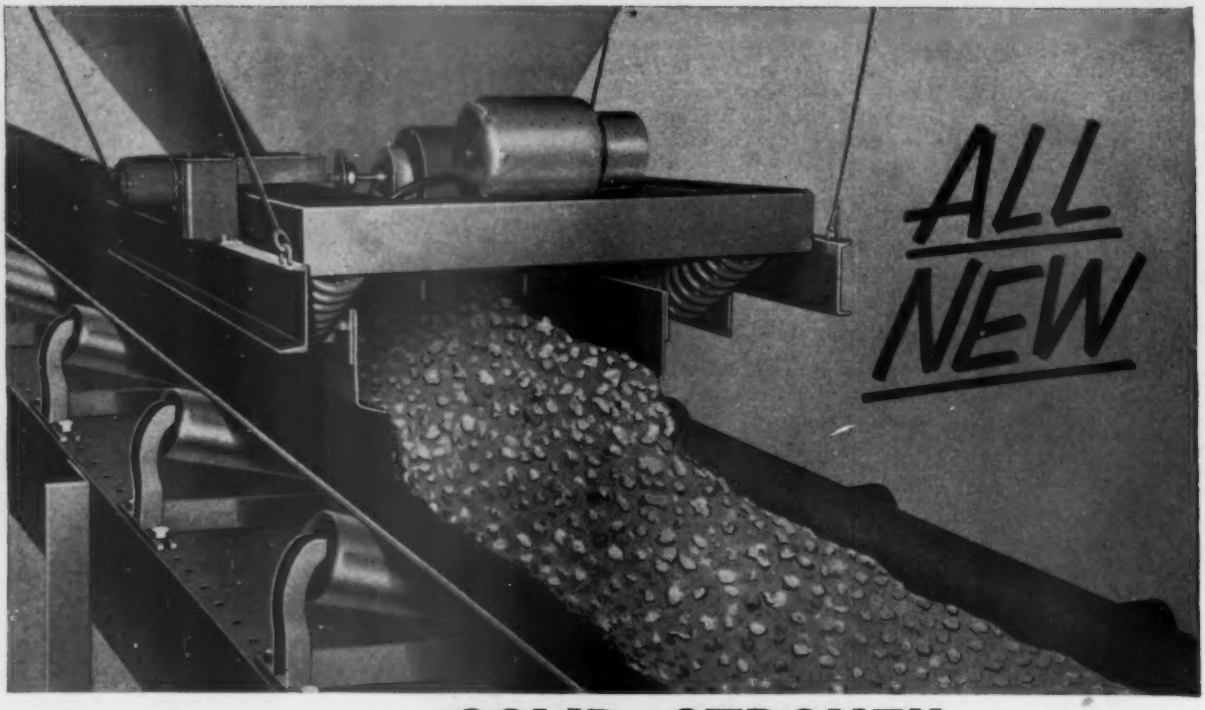

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Economical

This was the comment made by Dunbar & Sullivan Dredging Company officials when asked why they chose Armco Dredge Pipe over other available pipe.

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For your dredging operations, Armco not only supplies a complete range of diameter and wall thicknesses—the right one for the materials you're handling—but all necessary pipe specials to match the entire job requirement.

For more information, send the coupon for Armco's newest folder on Dredge Pipe. Find out how you, like Dunbar & Sullivan, can get "more yardage at less cost."

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Armco Drainage & Metal Products, Inc., 7951 Curtis Street, Middletown, Ohio

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stripping . . . ripping

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"Our International TD-25 doubles load delivery of regular 'dozer blade . . . using V-type blade on spoil leveling," reports Partner Carl Sartori, Willowbrook Mining Co., Slippery Rock, Pa. On-course steering with this heavy offset load is achieved by up-shifting speed of load-side track—to put extra power leverage where needed.

Doubling for dynamite—this TD-25 rips and breaks up a 30-inch vein of coal—to reduce cost of loading out with a 3-cu yd power shovel for Rice Brothers Coal Company, Phillipsburg, Pa. Power-on-both-tracks steering means "full speed ahead" with the ripper. The two TD-25's on this job team up with three draglines to move 25% of a 60-foot-deep overburden.

Pushes of over 600 feet pay off for Contractor C. R. Davis, Albuquerque, New Mexico—producing road gravel. Instant speed control of either or both tracks with the planetary transmission means positive load control—to heap the blade and "run" to the crusher. Then the "25's" high reverse of 7.5 mph means fast back-up for the next push. What would have been a costly two-tractor operation is efficiently done with one TD-25!

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..highballing loads!

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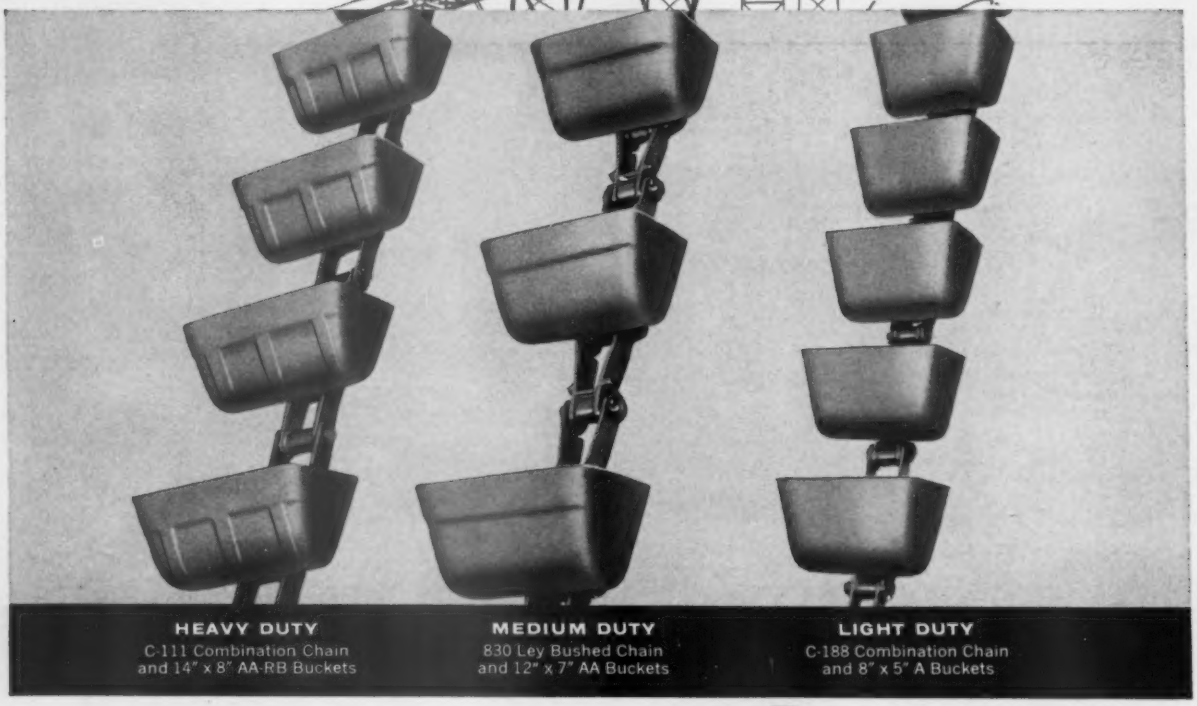

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Moline "matched-to-service" buckets and chains can replace costly specials and provide extra long service life.

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Moline Chains

Moline Malleable Iron Company
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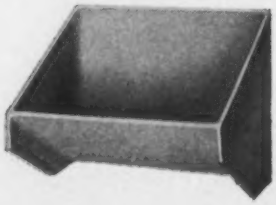
CAST "AC" BUCKETS
Designed for cement, lime and other dry, powdery materials. High fronts provide extra load capacity. Hooded backs reinforce buckets and permit closer spacing. Extra thickness of metal at wear points gives extra long service. Four sizes available . . . plain or punched for chain attachments.

"CONTINUOUS OPERATION" BUCKETS for elevating stone, gravel or coal provide large capacity at slow speed. Flanges on the bottom form a chute for material discharged from the following bucket. Available in Malleable or Promal.



Washington News Letter

By S. HERBERT UNTERBERGER

The Jawbone Approach

AT least since the first Franklin D. Roosevelt administration, Washington has been a prolific source of new terms in the English language. "Brain Trust" and "New Deal" are two examples which come to mind immediately. The latest addition to this vocabulary is "the jawbone approach." It refers to the recent efforts by the Kennedy Administration to accomplish by conversation objectives for which there is no legislative authority.

The most recent use of this approach has been the President's effort to prevent a rise in the price of steel. There is no legislation which authorizes him to control that price even if he should regard such stability as being in the public interest. This, however, inhibited him not at all. And, indeed, it looks as if his efforts may succeed, for the most part.

For this reason, a review of the technique is important, particularly since its use will, no doubt, be repeated from time to time. The gambit was set in motion by a report submitted by Walter Heller, chairman of the Council of Economic Advisors. This report concluded, on the basis of an analysis of rather general statistics, that, by and large, the steel industry could absorb the wage increase due on October 1 without any general increase in the price of steel.

This wage rise was the last of a series of deferred increases agreed to by the steel industry as a part of the settlement of the 116-day steel strike in 1959. This will be remembered as the settlement in which former Vice-President Nixon played such a prominent role.

To arrive at its conclusion, the Council of Economic Advisors assumed that the hourly increase would average about 10 cents and that it would be limited pretty much to the production workers. Representatives of the steel industry arrived at the somewhat higher estimate of 13 cents an hour. The steel men assumed, further, that the production workers' raise would be followed in short order by a similar raise for salaried employees. All parties agreed the cost would be sizable—in excess of $200 million.

Soon after the issuance of this report, the President sent a personal letter to the chief executives of each of the steel companies who had agreed to the wage increase, exhorting them to refrain from increasing steel prices because of the higher labor cost. In support of his request, he cited the analysis of the Council of Economic Advisors. As an incentive to its acceptance, the President promised essentially that he would similarly exhort the Steelworkers Union not to make unwarranted wage demands when they negotiate for a new contract next summer.

When the President sent his letter, he did not fail to exploit his initiative by using all of the propaganda machinery available to the White House. The President's press secretary, Pierre Salinger, saw to it that it received the widest distribution. By releasing it to the press, radio, and television, he enlisted the jawbones of a large number of reporters, columnists, and commentators.

The steel company executives, taken by surprise, sputtered a little, but shortly regained their aplomb. Whereupon, they did a little "jawboning" of their own by drafting replies. In accordance with the protocol of size and strength in the market, the United States Steel Corporation went first. They respectfully differed with the President and pointed out that although wages had risen since 1958, steel prices had not. They did not give Mr. Kennedy the promise he requested; neither did they threaten to increase the price of steel.

In addition to the public debate, Roger M. Blough, chairman of U. S. Steel, met privately with the President. Exactly what was said in this session is not recorded, although it is known that even then no promise was made.

It now looks as though the President's approach may be successful. One factor contributing to that success is the recent move in the aluminum industry to reduce prices. Since these metals are competitive for many uses, steel would certainly lose some volume if its price were now to rise. Whether the President was informed about this development in aluminum in advance and was thereby emboldened to go forward with his plan, is not known. In any event, the jawbone used may have an aluminum cast to it.

There has been no lack of criticism of this tactic. New York University's Professor Jules Backman, a frequent industry spokesman, regards it as another threat to confidence and a favorable outlook for profits, the essential bases for new capital investments. He is very much concerned lest this policy may spread to other products and other areas.

This fear is widely shared by others. Perhaps those most concerned are the labor unions, and particularly the Steelworkers Union, which may be the very next group to feel the impact of the President's

(*Concluded on page* 76)

engine power BY CATERPILLAR

75% cut in fuel costs leads to purchase of second Cat Natural Gas Engine for increased quarry efficiency

The McClinton Bros. Limestone Quarry is located at Johnson, Arkansas, five miles north of Fayetteville. Products are dry white limestone, cement, asphalt and concrete mix, cement blocks, and aggregates. Caterpillar Engines have played a large part in increasing quarry efficiency.

Owner Clark C. McClinton beside the Cat G375 which furnishes power to drive the quarry's motors. His experience with this engine led him to the purchase of a second, the G342, for the impact breaker.

The new Cat G342 supplies power for an impact breaker. It replaced an electric motor and has proved to be more economical and more efficient for this operation.

Clark C. McClinton bought his first Caterpillar Diesel over 14 years ago. When he was ready with a modernization plan for his quarry at Fayetteville, Arkansas, he purchased a Cat G375 Natural Gas Electric Set for prime power. The result: 75% savings in fuel costs and maintenance outlays. In another step of his plan: an engine to power an impact breaker, Mr. McClinton did not have to make a choice. It had already been made for him by his experience with Caterpillar Engines, particularly the G375. "The fuel economy and low initial cost per horsepower convinced us that another Cat Natural Gas Engine would be a worthwhile addition to our quarry." In addition to replacing an electric motor for powering the impact breaker, the Cat G342 also eliminated the need for a transmission to vary the speed required for stone fineness.

The reason you get such dependability from Cat Natural Gas Engines is that they are built essentially as diesels—only the pistons and fuel systems have been changed for natural gas operation. This built-in diesel strength allows high compression ratios for high horsepower output and superior fuel economy. For the full story, see your Caterpillar Dealer. He can show you dramatic proof of the superiority of Caterpillar Natural Gas Engines. He's listed in the Yellow Pages. Or write Engine Division, Caterpillar Tractor Co., Peoria, Illinois.

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Engine Division, Caterpillar Tractor Co., Peoria, Ill.

Labor Developments

The Hoffa Story Continues

DESPITE the fact that (1) the U. S. courts have relinquished their surveillance over the Teamsters Union; (2) that the Union has held a convention in which its constitutional provisions were carefully observed; (3) that its constitution was amended to conform to newly established legal requirements; and (4) that Jimmy Hoffa was elected virtually unanimously by the convention delegates, who were, themselves, properly elected—the Teamsters Union continues to be one of the most controversial elements in the labor movement and on the domestic scene generally.

Just before Congress adjourned, Senator John L. McClellan, who has been spending a good deal of his time in recent years investigating the Teamsters and preparing and sponsoring legislation designed to reduce their power, introduced another bill for that purpose.

This measure, known as the Anti-trust Laws Amendment of 1961, would amend the Sherman, Clayton, and Norris-LaGuardia Acts so as to prohibit a union from combining with an employer or any other union, including another local of the same International, to strike, picket, boycott, or interfere with an employer engaged in transportation. The Senator announced that he hoped to hold hearings on the proposed measure early in the next session of Congress. This may spearhead a drive on Congress to halt Hoffa in 1962.

The struggle over Hoffa and the Teamsters Union is not limited to the halls of Congress. Indeed the members of the labor movement, particularly the unions in the AFL-CIO, are beginning to take sides on the question of whether that union, which has now established a record for observance of its constitutional rules, shall be admitted to the federation, from which it was expelled several years ago, principally because of its record of corruption, as revealed by the McClellan Committee investigations.

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

No doubt, the elected leadership of the AFL-CIO is opposed to such readmission. Its president, George Meany, has said so directly. He, as well as many of the directors, are unconvinced that any essential change has taken place in the Teamsters Union. It is their general position that as long as Hoffa continues to be president, no amount of formal observance of the rules will eliminate what they regard to be the corrupt elements which control the use of the Teamsters' power.

However, there have always been some unions and union officials who were not really in favor of the Teamsters' expulsion and would clearly support their readmission if this could be accomplished without too much risk. The principal danger is that the struggle over readmission could be so bitter that it would become the instrument for completely undoing the already seriously loosened bonds which are holding the AFL-CIO together.

Until recently, the principal unions which would be expected to support readmission were the building trades unions, whose philosophy and method of operation is not very different from that of the Teamsters. In addition, there is a relatively small number of rather weak unions which for years have borrowed strength from the Teamsters, principally through the device of having Teamster members refuse to go through their picket lines.

Recently, however, support for readmission of the Teamsters Union came from an unexpected source—from Michael J. Quill, president of the Transport Workers International Union. In a statement, remarkable for its involuted reasoning, he called Hoffa "the cleanest man in the United States." Then he asked the rhetorical question, "If after a Senate investigation and trial before half a dozen juries they weren't able to convict him, and if all the law enforcement agencies have made an honest man of him, is there any need to keep Hoffa and his 1,700,000 members outside the orbit of organized labor?" The pose of wide eyed innocence struck by Mr. Quill hardly conforms with his known records of remarkable success in the sophisticated political and economic environment that is New York.

There is some suspicion that Quill's position was, at least, as much motivated by headline seeking and an effort to give some zest to an otherwise routine convention of one of the smaller unions as by any deep concern for the welfare of the giant union and its leader. This objective was fully accomplished when Secretary of Labor Arthur J. Goldberg addressed the Transport Workers convention, using the occasion to disagree with his host and to indicate his opposition—and presumably that of the Administration—to Quill's proposal.

One of the questions that is never fully answered is why the Teamsters are so anxious to get back into the AFL-CIO, which so unceremoniously expelled them four years ago. Certainly such reaffiliation would

(*Continued on page* 76)

More efficient CRUSHING AT LOWEST COST for labor, power and upkeep with WILLIAMS REVERSIBLE IMPACTOR

REVERSIBLE ROTATION prolongs parts life without manual adjustment. A simple reversing switch on motor does it.

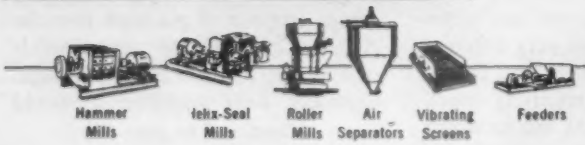
INTERIOR VIEW of small Impactor shows typical rugged hammers, impact blocks and liners made of manganese steel and other alloys. Rotor removable without disturbing feed or other mechanisms.

For secondary crushing, the economy and high production of a Williams Reversible Impactor is unequalled, whether raw material is hard and abrasive or soft and friable. Precision control of specified top-size is easy, usually in a closed circuit system, from a coarse 2" with minimum fines, down to 35 mesh or finer.

The Impactor has no grates. Material fed into the mill is reduced to proper size while rebounding between the whirling hammers and impact blocks, until discharged from bottom opening. Grinding or rubbing action is eliminated—power, replacement parts and downtime are reduced to a minimum. No fine adjustments need be maintained.

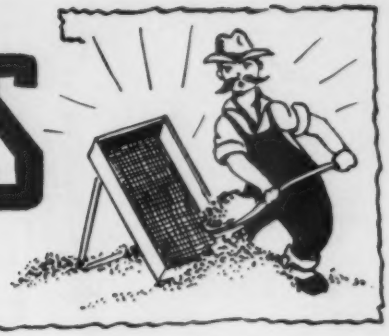
Reversible rotation is a prime feature of the Williams. So is *Wide Open Accessibility* to interior. So are the *Interchangeable Impact Blocks* to balance wear. So are the many other exclusives that hold cost-per-ton to the very lowest. There is a size and model for your exact needs. *Write for catalog.*

WILLIAMS PATENT CRUSHER AND PULVERIZER CO.
802 St. Louis Ave. • St. Louis 6, Mo.



WILLIAMS
CRUSHERS GRINDERS SHREDDERS
Oldest and largest manufacturers of hammer mills in the world

SCREENINGS



By RAY L. SMITH JR.

THERE is an electronics man in town who is fishing experimentally with gadgets such as electrodes and wires and Hi-Fi equipment.

Sound fantastic? Remember, this is the electronic age, and anything is possible today.

These space-age experiments in the sea may affect you a great deal. If you are a lover of sea food it may put a lot more crawfish in your newburg. And if you are a sports fisherman you may be able to push a button marked "sailfish," for instance, and a sailfish will magically appear within your charmed circle of sound and electricity. (Experiments have shown that fish can be made to follow sound like the children followed the Pied Piper of Hamelin. The Russians have a trawler that is successfully using this device to catch fish.)

Of course fishing with the aid of sound is not new. Commercial fishermen thrash the water with cane poles to bring up trout. At times anglers roar over areas with outboards to stir up action. And sailfish sportsmen use poppers and other noise devices to attract their game.

But the present day experts have been making many underwater experiments using new and different types of electronic equipment, trying to measure these low frequency movements so as to artificially reproduce sounds to attract or repel different species of fish. Someday they hope to be able to use sound to attract a fish such as a tuna, for example, and repel a shark or barracuda.

One electronics expert is working on the idea of underwater Hi-Fi. (And it may become a part of every well-equipped swimming pool some day.) He has placed a large water-proofed speaker beneath the water with music being played. When you stand ready to dive in you hear nothing. But as soon as you enter the water you are surrounded by rich hi-fidelity sound.

Could be, someday, you'll be able to use sound at the beach to attract a blonde, and repel a brunette or redhead.

Could be!

Potpourri and Succotash

First Child: "I'll give you a head start and beat you in any race you name."
Second Child: "Okay, let's slide down the bannister."

A draftee was awakened by his platoon sergeant after the rookie's first night in an Army barracks.

"It's four-thirty!" bellowed the sergeant.

"Four-thirty!" gasped the rookie. "Man, you'd better go to bed. We got a big day tomorrow!"

A contractor was driving past a new development he was building when he saw a group of men digging in a trench some distance from where they were supposed to be working. He stopped the car and strode over to them.

"What's going on here?" he asked angrily.

"Trench caved in," one of the men replied, without stopping his digging.

"Does the foreman know about it?"

"Well," said the workman, "if he doesn't, we'll tell him about it as soon as we dig him out."

Husband: "My wife does bird imitations."
Friend: "For instance?"
Husband: "She watches me like a hawk."

"Dear Sir: Please send me my money back. After taking six cans of yore corn syrup, my feet aren't any better than they was."

In olden times the building of a new house involved a public ceremony known as raising the ridgepole. Today it involves a private ceremony known as raising the money.

A prospect for life insurance was filling out the necessary application. Included in the information required was one question calling for the correct weight of the applicant. The man filled it in, "177-with glasses."

The insurance agent was somewhat puzzled by this entry. "Why," he asked, "don't you put down your weight minus the glasses?"

"Because," was the reply, "I can't read the bathroom scale without my glasses."

Typographical errors can spoil many a sale. Take for instance the following series of classified ads from a small town newspaper:

August 20: "For Sale. Slightly used farm *wench* in good condition. Very handy. Phone: 154-B. A. Phillerup."

August 24: "Correction. Due to an unfortunate error, Mr. Phillerup's ad was not clear. He has an excellent *winch* for sale. We trust this will put an end to jokesters who have called Mr. Phillerup and greatly bothered his housekeeper who *loves* with him."

August 30: "Notice! my W-I-N-C-H is not for sale. I put a sledgehammer to it. Don't bother calling 154-B. I had the phone taken out. I am NOT carrying on with Mrs. Hardnose. She merely L-I-V-E-S here. A. Phillerup."

"Our 48 Ford Trucks have given maximum economy in every way!"

says Fred Newkirk, Manager of Materials Transportation Company, Inc., Corpus Christi, Texas

"We are using Ford Trucks exclusively because they provide important savings—starting with a lower initial expenditure. We estimate that each Ford costs us about $1,500 less than other makes of comparable size and capacity. Our maintenance and repair costs are less, too. The greater parts interchangeability on Ford Trucks makes it possible to reduce our parts inventory by about 50%; this frees $2,500 of working capital. And in operating expenses, we save on gasoline because our Fords deliver an extra ½ mile per gallon.

"They have proven more durable, too. For example, our 1958 Ford F-1000 has logged over 160,000 miles without even having the heads or pan off. We expect 200,000 miles from these Super Duties before a major overhaul. Some of our 1955 and 1956 Ford F-900's still have their original brake linings after 300,000 miles.

"Our trucks operate six days a week, and the average fleet mileage is 51,000 miles per week. We haul 48,000-lb. payloads of bulk cement or 37,760-lb. payloads of sack cement for Halliburton Portland Cement Company. Our drivers are also very enthusiastic about these new Ford Super Duties. They report that with 72,000-lb. grosses Fords are smooth riding and easy to handle."

Solid testimony that Ford's full-time economy only starts with low price!

FORD TRUCKS COST LESS

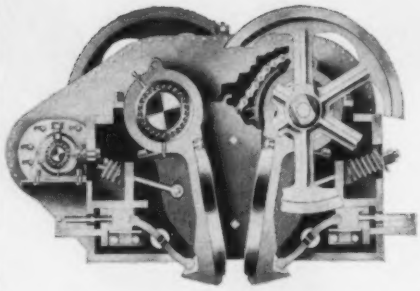
PRODUCTS OF Ford MOTOR COMPANY

HALLIBURTON
FORD
J-27244

Make more money on your toughest

CEDARAPIDS JAW

When you crush more rock, you make more money . . . especially if you're working in tough, abrasive granites, cherts, basalts, etc. That's why you need the benefits of high-capacity Cedarapids Jaw Crushers in your plant. For instance, a Cedarapids Twin Jaw Crusher turns out 40% to 100% *more* material than a single jaw of comparable size, yet jaws last 5 to 8 times longer. Translate *that* into terms of dollar profits!



JOB-PROVED BENEFITS THAT SET JAW CRUSHER STANDARDS FOR THE INDUSTRY

- Overhead eccentric throw, the angle of the toggles, and length of jaws are properly correlated for maximum crushing capacity and rapid discharge.
- Eccentric shaft extra heavy to absorb strain and minimize shaft flexure.
- Adjustable-tension timing chain drive on Twin Jaw Crushers prevents trouble due to possible shaft flexure. No fine-cut timing gear that requires critical alignment.
- Heavier than average self-aligning pitman bearings placed close as possible to side bearings to absorb side thrust and prevent strain under heavy load.
- Reinforced, electric-welded crusher bases are completely stress-relieved for long life.
- Extra-heavy flywheels insure smooth operation under surge feeding with minimum power.

crushing jobs with

CRUSHERS

TWIN JAW or SINGLE JAW—

there's a size for every capacity requirement

Cedarapids Twin Jaw Crushers are recommended for high capacity output in hard or abrasive rock and in gravel pits containing high percentages of oversize. In certain conditions, they are profitably used where their high capacity permits them to replace a combination of single jaw and roll crushers. Available in 12″ x 16″, 12″ x 36″ and 18″ x 36″ sizes.

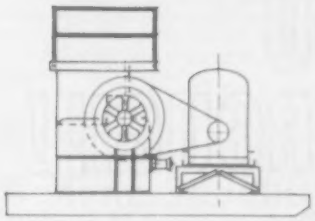
For conventional crushing jobs, the broad line of Cedarapids Single Jaw Crushers includes plain and roller bearing models in seventeen sizes, from 9″ x 16″ to 42″ x 48″.

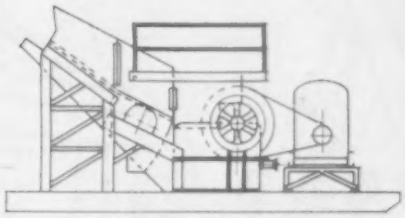
Cedarapids Stationary Plant Engineers . . .

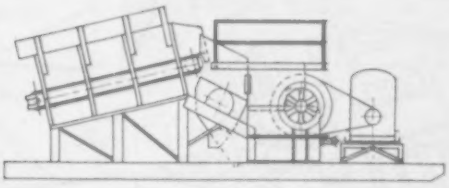
can engineer your plant to make more money for you. They are experienced in analyzing specific job conditions (including raw material, feed sizes, possible contamination, percentage of fines or hard and soft stone) with an eye to meeting specifications with the tonnages you want. They are experts in recommending the correct units for the specific job and in designing plants with minimum structural costs. The result is a clean plant, efficiently laid out with only the exact units you need, which returns more profit per dollar of investment. Get Cedarapids Engineering for your next stationary plant or to modernize your present operation. There's no obligation . . . just call your Cedarapids Dealer for full details.

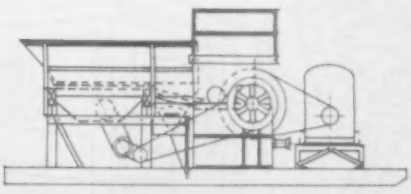
SKID-MOUNTED FOR FAST, EASY INSTALLATION

Check the time and money saving benefits of Cedarapids skid-mounted crushers. These completely engineered units are "packaged" at the factory, ready to be set up on concrete piers with no additional engineering. Four of the many combinations available are shown below.









Cedarapids

BUILT BY IOWA

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa

Cedarapids 42″ x 48″ Single Jaw Crusher, working in South Carolina granite, is producing 300 tons per hour of 6″ material, crushing 100%.

81161 M

WHEN SO MUCH DEPENDS ON YOUR TIRES...

COUNT ON FIRESTONE TO SEE YOU THROUGH!

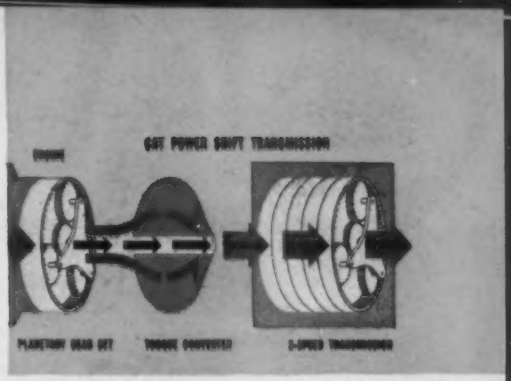
Mount Firestone Super Rock Grip Deep Tread tires on your hard-pushing quarry trucks—and watch downtime take a licking. The only tread design of its kind, this tire's 50% deeper tread is made of Firestone Rubber-X, tough enough to fight off cuts and bruises in the ruggedest off-highway going. And, because this tough tread extends through to the cord, you get a wearing-base bonus in recaps.

Its Shock-Fortified nylon cord body, too, staves off schedule-disrupting impact breaks. For on-the-job service and quarry tires at their best . . . naturally, you'll see your Firestone Dealer or Store.

Firestone

Always Specify Firestone Tires When Ordering New Equipment

Copyright 1961, The Firestone Tire & Rubber Company



The exclusive Cat power shift transmission works like this: The engine drives planetary gears in the flywheel, where output torque is divided. Part of it is routed to the transmission through a torque converter (providing anti-stall and load-matching ability). Part goes direct to the three-speed transmission (provides economy and fast response of direct drive). It's one ton of muscle built with the precision of a fine watch.

WITH CAT POWER SHIFT TRANSMISSION IN A D8H, A MAN'S FINGER TIPS CAN CONTROL 30-50% MORE PRODUCTION

Your present equipment may move material at low cost—but here's one reason a D8 Series H Tractor may move it a lot cheaper.

It's the Caterpillar power shift transmission—the only transmission available that combines the advantages of direct drive, torque converter drive and power shifting in a single unit. It greatly increases operator efficiency—offers important new opportunities for broadening your profit margin.

Here's how this big step ahead in transmission design helps your operator get more work from the machine: A single selector lever replaces the familiar master clutch, gear change and forward-reverse levers. Using this single selector lever, the operator can shift on the go in a split-second even under full load. He changes speed or reverses direction with finger-tip ease . . . without clutching . . . without braking . . . without even lifting his arm from the arm rest. And the lever is mounted for left-hand control, leaving the right hand free for maneuvering the tractor or controlling the dozer, ripper or scraper. Convenience makes it easy to choose the right speed at the right moment.

Matching this ease of control are safety features you'll like. A safety lock in the selector housing holds a parked machine in neutral while the engine is running. Another safety device automatically shifts the selector lever to neutral when the engine is stopped.

The simplicity and safety of the Cat power shift transmission make your good operators even better and less experienced operators more effective. They can take greater advantage of the tractor's power and capacity to speed the work. And ease of operation keeps their efficiency high throughout the day.

Cat power shift transmission also means a big jump in your machine's efficiency too. You'll particularly notice the difference on jobs where frequent shifting is the rule—such applications as feeding a shovel or short-cycle dozing.

For instance, in dozing, the operator starts to pick up the load in second gear—then shifts on the go to first for full lug yardage. There's no clutching, no lost time or momentum when changing speeds. An easy move back to second drifts the material to its destination. Another move of the lever puts the machine in high-speed reverse for fast return to the digging area.

Machine efficiency is *always* high. Cat power shift transmission provides the needed power at the highest possible speed. Its exclusive torque divider design combines the snap and economy of direct drive with the load-matching ability and anti-stall characteristics of torque converter drive—and three forward-reverse speeds tailor it to the entire working range.

Just how much of an increase will the Cat power shift transmission make on your job? This will depend on your application. On short-cycle dozing, reports in our file show increases *as high as 50%* over similar-sized machines with other transmissions. Some users flatly state they will never buy another track-type machine in the 200 HP class unless it is a Cat power shift unit.

Power shift transmission is just one reason the D8H may be a far better profit tool than the machine you are now using. There are other features of this 235 HP turbocharged tractor that could be equally advantageous in your work. Your Caterpillar Dealer will welcome the opportunity to discuss the D8H in terms of your job and present facts and figures so you can determine true benefits. And if a demonstration with measured results would help, he will be glad to make arrangements.

Call him today.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.

CATERPILLAR

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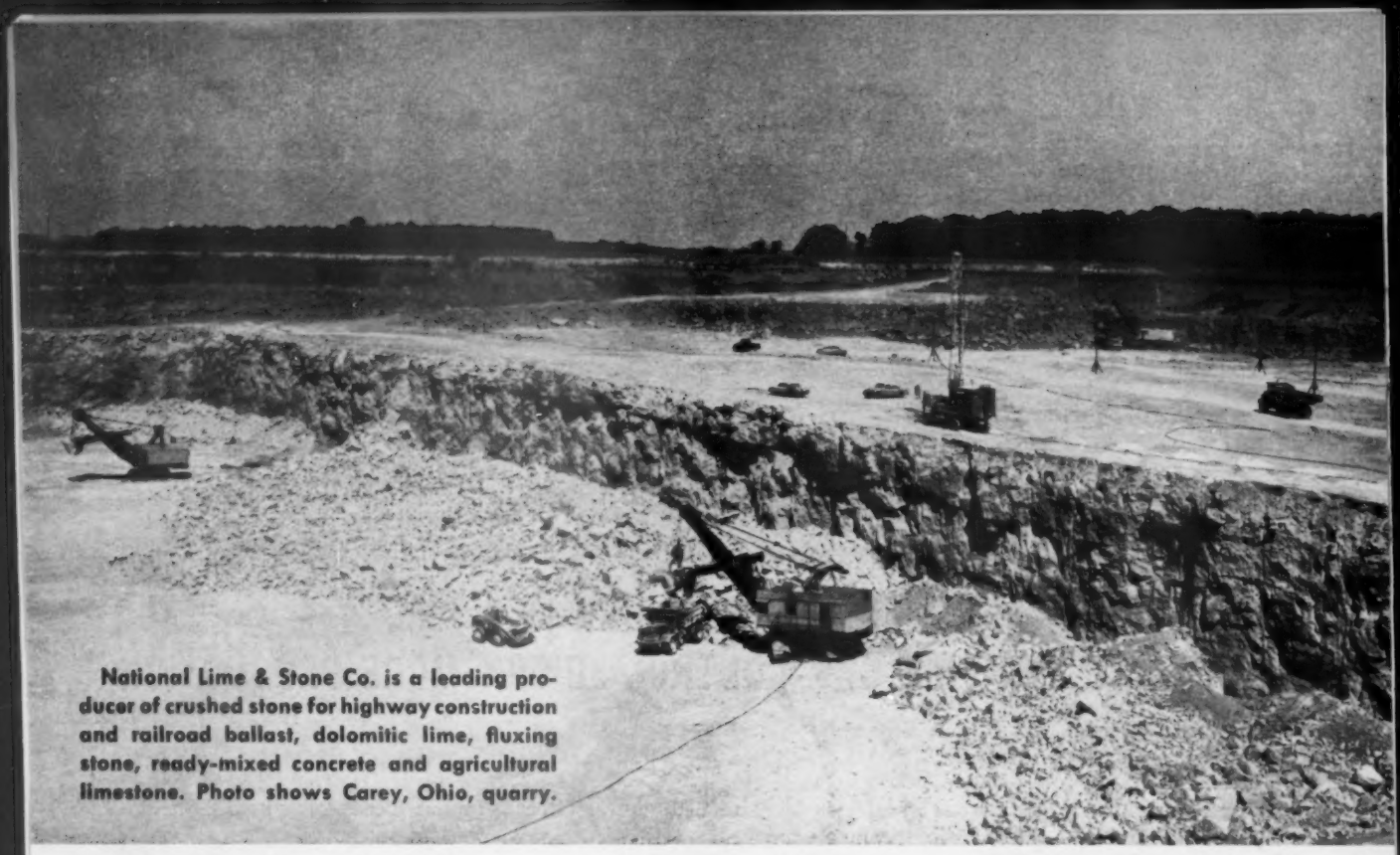
STEP UP PRODUCTION AND PROFITS WITH POWER SHIFT TRANSMISSION



National Lime & Stone Co. is a leading producer of crushed stone for highway construction and railroad ballast, dolomitic lime, fluxing stone, ready-mixed concrete and agricultural limestone. Photo shows Carey, Ohio, quarry.

Special Austin explosive cuts blasting costs for National Lime & Stone Co.

James H. Ratchen, blasting superintendent at National Lime's quarries in Bucyrus, Carey, Findlay, Lima, Marion, Rimer, Buckland and Delaware, Ohio.

As one of Ohio's largest stone producers, National Lime & Stone Co., Findlay, requires steady output from its 8 quarries. Output, in turn, depends upon highly efficient blasting under widely varying conditions.

Blasting Superintendent James H. Ratchen says: "Austin has worked with us constantly to develop the right combination of explosives to provide excellent, low cost breakage. In addition, we have never experienced a delay due to late delivery. Shipments are always arranged to permit fast unloading at either magazine or job site."

One of the outstanding Austin products designed specifically for National Lime is a special high density blasting agent. This attains a velocity of over 14,000 feet per second. Austin also supplies Apcomite, Extra Gelatin, Apcogel, Detonating Fuse and other dynamites, blasting agents and primers to meet each requirement. A-5906A

USED IN 1833 AUSTIN & EVER SINCE

AUSTIN POWDER COMPANY

Cleveland 13, Ohio

News of the Industry

$21 Million Expansion Set By Bestwall Gypsum; High '61 Profits Seen

Plans have been disclosed by Bestwall Gypsum Company officials for the expenditure of about $21 million by the end of 1962 on several company projects.

New manufacturing plants and a new paper mill on the East Coast are scheduled. A gypsum rock quarry in Nova Scotia will be developed. When completed, the program will have boosted the company's manufacturing capacity by more than 20 percent.

The Nova Scotia quarry will provide raw materials for the new eastern plants. Preparations for quarrying have already been started at the Cape Breton Island deposit site, near Halifax, N. S. Quarrying and crushing facilities will have an annual capacity in excess of 750,000 tons. Initial production is scheduled for the second half of 1962. Crushed gypsum will be rail-shipped to Point Tupper on the Strait of Canso, where storage facilities and a marine shipping terminal will be built. Foundation Company of Canada, Montreal, is chief contractor for the $3,000,000 project.

Currently, the gypsum rock used in Bestwall's eastern and Gulf Coast plants comes from the Dominican Republic. (Bestwall inland plants are located near quarries.)

Officials expect 1961 earnings to top those reported in 1960.

A multimillion-dollar storage and distribution facility will be under construction soon at South Norfolk, Va., for Atlantic Cement Company. The South Norfolk site will be supplied cement from the 10,000,000-bbl. mill being built by Atlantic in Ravena, N. Y., which is scheduled for completion in January, 1963. The distribution depot will consist of a wharf and 16 storage silos on a nine-acre site at Money Point.

Gibsonburg Lime Products Acquires Lime Business Of Woodville Lime & Chem.

W. H. Price II, vice-president of The Gibsonburg Lime Products Company and George C. Urschel Jr., president of the Woodville Lime and Chemical Company, announced that The Gibsonburg Lime Products Company had acquired the building and industrial lime business and trade names of the Woodville Lime and Chemical Company.

The effective date of the purchase was October 23. All of Woodville's sales organization will be retained by Gibsonburg and will be operated as the "Blubag" Division. Employment will be increased slightly at Gibsonburg's plant. Brand names of both firms will be retained.

The Woodville Lime and Chemical Company will continue to produce chemical, metallurgical, and road stone and manufacture and distribute fertilizer products at its Woodville, Ohio, plant.

Coming Events

November 13-17, 1961—College Park, Md. 16th annual Short Course for Industry Technicians, National Sand and Gravel Association and National Ready Mixed Concrete Association. University of Maryland.

January 12-13, 1962—Miami Beach. Annual meeting, The Expanded Clay and Shale Association. Deauville Hotel.

January 15-19, 1962—Miami Beach. January meeting, National Limestone Institute, Inc. Roney Plaza Hotel.

January 28-February 1, 1962—Chicago. 43rd annual convention and exhibition, Associated Equipment Distributors. Conrad Hilton, Sheraton-Blackstone, and Pick-Congress hotels and Essex Inn.

February 5-9, 1962—Chicago. 32nd annual convention and biennial show, National Sand and Gravel Association and National Ready Mixed Concrete Association. Conrad Hilton Hotel and McCormick Place.

February 12-14, 1962—Chicago. Annual convention and machinery exposition, National Crushed Stone Association. Conrad Hilton Hotel.

February 18-22, 1962—New York. 91st annual meeting, American Institute of Mining, Metallurgical and Petroleum Engineers, Inc. Statler Hotel.

← Enter 22 on card, page 181

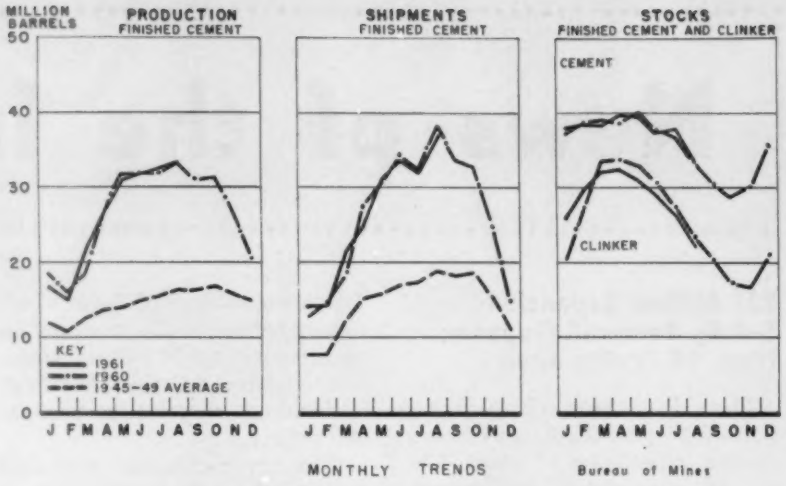
Construction Put in Place During September, 1961 Ahead of Last Year

The value of new construction put in place in September, 1961, amounted to $5.4 billion, according to preliminary estimates of the U. S. Department of Commerce. This was a small increase over the revised estimate for August; normally a slight decrease is expected between the two months. The amount spent for total new construction was 5 percent above September, 1960.

Items: Private construction, estimated at $3.7 billion, matched the revised August level, but was 5 percent greater than in September, 1960. Private nonfarm-residential was estimated at $2.1 billion—about 1 percent less than the revised August estimate, but 6 percent greater than in September, 1960.

Item: Public construction, estimated at $1.7 billion, was 3 percent greater than the revised estimate for August, and was also 5 percent above September, 1960.

Cumulative Value: New construction expenditures in the first nine months of 1961 were estimated to total $42.3 billion, compared to $41.3 billion in the same period last year. Total private construction expenditures, at $29.8 billion, increased slightly from last year, while private nonfarm-residential declined 3 percent to $16.6 billion, and total public construction increased 3 percent to $12.5 billion.



— August, 1961, Finished Portland Cement —

SUMMARY—Production of finished portland cement in August, 1961, as reported to the U.S. Bureau of Mines, totaled 33,262,000 barrels—about the same as in August, 1960. Mill shipments totaled 37,106,000 barrels—an increase of 2 percent compared with August, 1960. Stocks of 33,775,000 barrels of finished portland cement were 2 percent more than those on hand August 31, 1960. Clinker production totaled 28,801,000 barrels—a decrease of 2 percent compared with August, 1960.

►PRODUCTION—A total of 169 plants in 38 states and Puerto Rico reported production of 33,262,000 barrels, compared with 33,270,000 barrels in August, 1960.

Clinker production was 28,801,000 barrels compared with 29,314,000 barrels in August, 1960.

High-early-strength portland cement output totaled 1,140,000 barrels—a decrease of 5 percent compared with August, 1960.

Prepared masonry cement production totaled 1,861,000 barrels—an increase of 8 percent over August, 1960. Masonry cements are reported in 280-lb. barrels.

►SHIPMENTS—Mill shipments of finished portland cement from 176 plants totaled 37,106,000 barrels, compared with 36,387,000 barrels in August, 1960.

Shipments were higher in 15 and lower in 8 districts. The greatest increases were in the Oklahoma-Arkansas and Texas districts, and greatest decrease was in the Oregon-Washington district.

Mill shipments of high-early-strength portland cement totaled 1,302,000 barrels—a decrease of 3 percent from the 1,336,000 barrels shipped in August, 1960.

Prepared masonry cement shipments totaled 2,019,000 barrels—a decrease of 4 percent from the 2,091,000 barrels shipped in August, 1960.

►STOCKS—Mill stocks of 33,775,000 barrels of finished portland cement were on hand August 31, 1961—an increase of 2 percent over 33,244,000 barrels on August 31, 1960. Stocks of clinker on August 31, 1961, totaled 21,919,000 barrels—a decrease of 7 percent from 23,444,000 barrels on August 31, 1960.

►FIRST EIGHT MONTHS OF 1961—For the January-August period, the production volume of finished cement amounted to 208,565,000 bbl., compared with 209,367,000 bbl. in the 1960 eight-month period. Total shipments for the first eight months of 1961 are reported at 208,568,000 bbl.; in the same period of 1960 total shipments were 205,653,000 bbl. (Shipment figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: August, 1960—236,000 bbl.; January-August, 1960—1,820,000 bbl.; August, 1961—270,000 bbl.; January-August, 1961—1,779,000 bbl.)

A-M Merger With Martin Approved by Stockholders

American-Marietta Company and Martin Company stockholders voted on October 9 to approve the merger of the two concerns into one corporation, to be known as the Martin-Marietta Corporation. Headquarters of the new firm will be in Baltimore, Md.

Grover M. Hermann (chairman of American-Marietta), who is the chairman of the new corporation, will divide his time between Baltimore and Chicago. The original A-M operation in Chicago will continue in its present form. George M. Bunker, chairman of Martin, will serve as president and chief executive officer of Martin-Marietta.

Sand-Gravel, R.M.C. Plant Opened by 4 Lakes Fuel-Supply

In Madison, Wis., a $400,000 sand and ready-mix plant recently opened on the East Side. The new plant is owned by Four Lakes Fuel and Supply Company, a subsidiary of Janesville Sand and Gravel Company, Janesville, Wis. An open house held recently was attended by more than 2,000 construction firm executives from the Midwest.

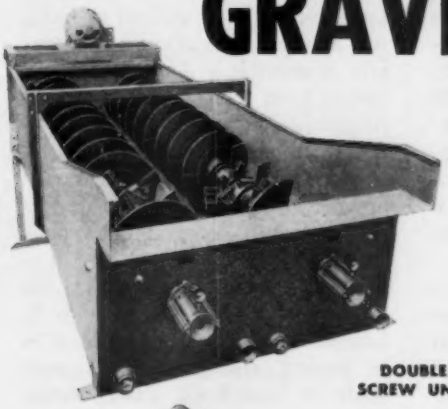
The parent company has plants in Janesville and will ship raw material to Madison by rail from the sand and gravel pits in Rock County. In the new plant, designed by Butler Bin Company, Waukesha, Wis., 21 different kinds of sand and gravel will be manufactured, according to Ellis Jensen, president of the parent company. The bins are highly automated and will hold 30 carloads of sand and gravel. Goodwin Lyons is president of Four Lakes.

Enter 25 on card, page 181 ➔

Freeto Asphalt Co., Chanute, Kan., profits from Eagle experience and service—successfully processes gravel at low cost with Eagle Double Screw Coarse Material Unit which they have mounted on wheels for portability.

WASH and DEWATER GRAVEL

at surprisingly low cost with an Eagle coarse material washer-dewaterer



DOUBLE SCREW UNIT

SINGLE SCREW UNIT

Users back our claim that the most thorough, efficient and economical way to wash and dewater gravel is with an Eagle Coarse Material Screw Unit. The ideal combination of rising currents of wash water and scouring of the material by the corrugated paddles provides removal of soluble foreign matter—silt, clay, vegetation—quickly and continuously. Number of paddles supplied depends upon characteristics of your material.

Screw flights convey the washed gravel to the discharge at top of the tub, wringing out the water on the way. Material as large as 2½" readily handled. Single and double screw units, as shown. Special models for trash, shale and coal removal. The facilities of our laboratory and pilot aggregate plant are available without obligation to run tests of your material for determining just what you can expect from Eagle Fine Material, Coarse Material and Log Washers. Send 10 lb. sample. Ask for Catalog.

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THIOKOL MUZZLES MISSILE MUSCLES

Thiokol Chemical Corporation makes the "muscles" for missiles at the giant Longhorn Ordnance Works, Marshall, Texas. Keeping the latest in solid missile fuels from "blasting off" in production, yet controlling the flow of such hot stuff to motor cases, was the problem.

Thiokol's answer was Farris Flex Valves...providing full pipe capacity for hard to handle solids, along with quick and positive shut-off. Other factors influencing Thiokol's selection were the vibration-absorbing qualities of Farris Flex Valves and the absence of internal parts and obstructions to block the flow of dangerous materials.

Controlling the flow of hard to handle acids, abrasives, corrosives, liquids, solids, powders and slurries is a Flex Valve specialty proved in thousands of successful applications during the last 25 years.

Farris

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Enter 26 on card, page 181

Leader of the India Cement Industry Productivity Team was R. R. Ayyar (sixth from left), manager, cement works, The Associated Cement Co., Ltd. A. E. Laurencelle (fifth from left), of the International Co-operation Administration, Washington, D. C., was project manager. The members of the team and PIT AND QUARRY personnel in the photo are (l. to r.) R. Singh; S. N. Chandak; J. P. Munsiff; R. L. Smith Jr., senior vice-president, PIT AND QUARRY; Mr. Laurencelle; Mr. Ayyar; L. S. Swaroop; Dr. N. K. Patwardhan; J. G. Kostka, director, marketing and research, PIT AND QUARRY; J. N. Tiku; and B. S. Chowdhury.

U. S. Tour of Indian Cement Group Includes Visit with P & Q Staff

On September 28, members of PIT AND QUARRY's management and editorial staff were honored to be the hosts for a visiting group of cement specialists from India who, as the Cement Industry Productivity Team from that country, were on a 5-week tour of the United States. The tour, under the auspices of the International Co-operation Administration of our government, was scheduled to furnish the visitors with the opportunity to see several cement operations, processing equipment manufacturers, fabricators of concrete building materials, research centers, and various government agencies.

As a part of their itinerary, a meeting with the PIT AND QUARRY staff was scheduled. There was an informal discussion on a wide range of factors in the production and marketing of cement in the United States. Particular interest was evidenced on such points as man-hours/bbl., fuel efficiencies, quality and extent of adequate raw materials, wet- *vs.* dry-process operations, slag cements, and beneficiation methods for upgrading raw materials.

Among the interesting factors in comparisons made between production in the various Indian plants represented by our visitors and production in the United States were fuel, manpower, and marketing. In India the fuel is almost exclusively coal. The number of men employed per plant of a given capacity is substantially greater in India than in the United States. (Although more automation could be utilized in India, the industry is providing as many jobs as possible.) As to marketing, aside from major governmental projects — highways, dams, etc. — nearly every private consumer is supplied with bagged cement. At present virtually the entire Indian cement industry is operating at peak capacity.

The group was escorted on the tour of the United States by A. E. Laurencelle, who represented ICA as project manager. Visits were made in New York, Pennsylvania, Washington, D. C., Texas, California, Wisconsin, and Illinois.

Heading the team was Rama R. Ayyar, cement works manager, Associated Cement Co. Ltd., Bombay. Others in the group were Dr. Narayan K. Patwardhan, director general, Council of Scientific and Industrial Research, New Delhi; Satya N. Chandak, general manager, Satna Cement Works, Birla Jute Mfg. Co., Ltd., Cement Dept., Calcutta; Bhu-

pal S. Chowdhury, electrical and mechanical engineer and manager, Parshva Properties, Ltd., Shahabad; Jamshed P. Munsiff, manager, Bhupendra Cement Works, Associated Cement Co. Ltd., Surajpur; Lakshman Swaroop Sharma, chief engineer, Dalmia Cement (Bharat) Ltd., Calcutta; Ranjit Singh, production manager, Kalyanpur Lime & Cement Works, Ltd., Shahabad; and Janki Nath Tiku, proprietor, Indian Pipe Corporation, Ramgunj.

The Indian cement representatives were the second group of overseas industry representatives who have called upon PIT AND QUARRY during the course of an ICA tour of U. S. installations. In June, 1959, our staff had the opportunity to host a group of Yugoslav cement engineers. Our interesting contacts have also included a number of smaller groups and individuals from virtually every country in the free world in which there is any degree of nonmetallic minerals processing.

Miami Area Aggregate Firm Opens 4,500-T.P.D. Plant

A new industry was launched recently in the Miami, Fla., area with the opening of a new plant by Coral Aggregates, Inc. This facility has a capacity of more than 4,500 tons of aggregate per day, plus sand, muck, marl, and sludge. The reserves of the operation, a 160-acre tract, are estimated at more than 8.5 million tons.

In addition to the usual structures and equipment, this virtually automatic plant has a research laboratory and a welding plant. Major stockholders in the venture, which is a publicly owned company, are Murray Levine, president, and his brother, Sam.

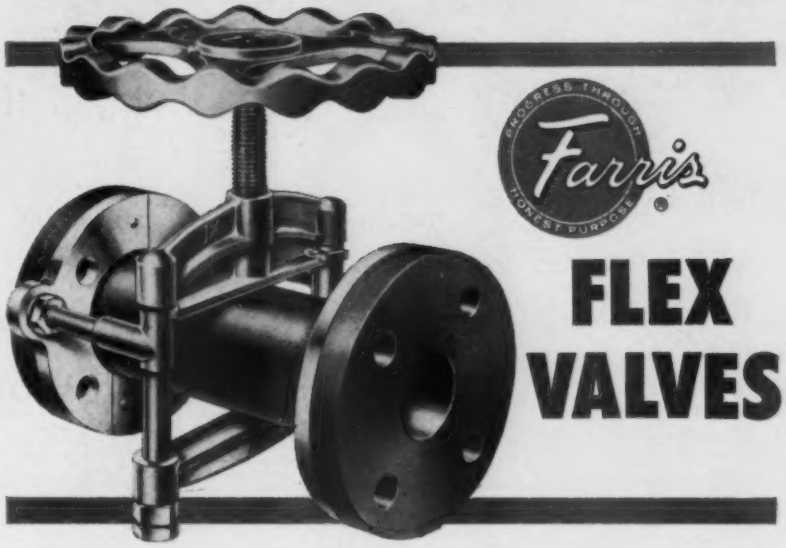
Susquehanna Western, Inc. Builds Shale Facilities

Susquehanna Western, Inc., has begun construction on a shale mine between Capistrano Beach and San Clemente, Calif. The firm will operate the facility under a long-term lease.

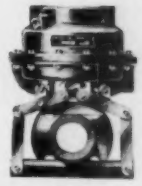
The shale will be used in concrete blocks as lightweight aggregate. The plant will have an initial daily capacity of 1,000 cu. yd., with provision for expansion.

NO JOB TOO TOUGH

ACIDS ■ ABRASIVES ■ CORROSIVES
LIQUIDS ■ SOLIDS ■ POWDERS ■ SLURRIES



FLEX VALVES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Series 5200

The toughest, longest-service valves you can use in pipelines carrying corrosive, abrasive, even explosive materials . . . wet or dry . . . that knock out ordinary valves in a matter of hours. In abrasive service, for example, Farris Flex-Valves outlast metal 11 to 1. Farris Flex-Valves become an integral part of your pipeline and provide full pipe capacity with nothing to block flow. They operate clean . . . even with solids in suspension or wet cement. And, they're as easy to keep clean as the pipes themselves.

Wide choice of flexible valve bodies for every process requirement. Manual or motor-operated types as well as metal-enclosed SuperSeal designs for high pressures and hazardous service.

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- Corrosion-Resistant
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AFFILIATES: Farris Engineering Corp. • Farris Combustion Controls Corp. • Farris Universal Machine Corp. Farris Industries Canada Ltd. • Farris Engineering Ltd., London, England

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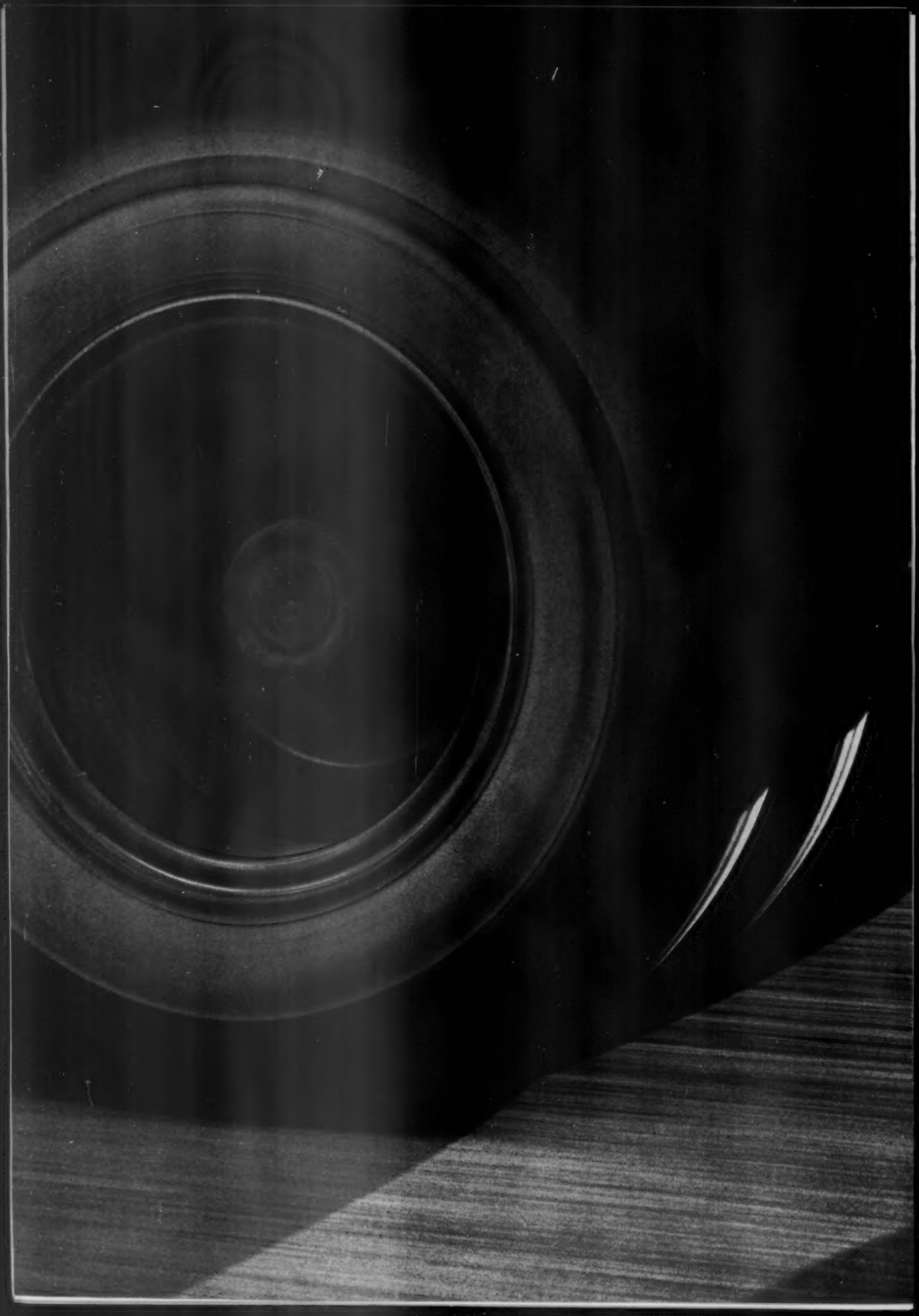


THE STUFF THAT WHEELS ARE TURNED BY

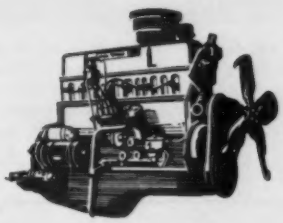
The accent's on torque in a big way for '62, in Chevy's new High Torque power lineup for medium- and heavy-duty trucks. New features, new performance characteristics, and even two brand-new extra-displacement V8's are tailored throughout the line to deliver a heaping hoodful of bulling, bruising torque—to dig in and move out under full capacity loads without a fuss. You'll find Chevy's brand of performance gives you a new kind of mastery over the toughest jobs you tackle, with brute-force breakaway power that just won't take no for an answer. There's no such thing as "no can do" when you're powered up the Chevy High Torque way!

High Torque 261 Six—Standard in Series 60 and 60-H models (GVW's up to 23,000 lbs.). Ideal for hauls that call for load-lugging High Torque power *plus* proved 6-cylinder economy. Delivers 235 ft.-lbs. of torque and 150 hp to handle maximum loads with low-cost efficiency. This engine backs up your bank account with brute strength to spare—with a forged steel crankshaft, high-alloy inlet valves, hard-faced exhaust valves with Rotocoils and much more.

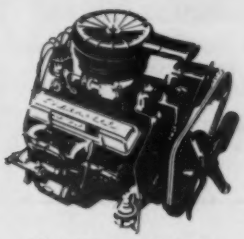
High Torque 327 V8—Optional at extra cost in Series 60 and 60-H (GVW's up to 23,000 lbs.). It's Chevy's newest and biggest medium-duty engine, ready to turn to with 305 ft.-lbs. of hard-pulling torque and 185 hp to tame your toughest jobs. Efficiency stays up, operating costs stay *low* with top-quality features like these: fuel-metering Power-Jet carburetor, durable precision bearings, aluminized inlet valves, hard-faced exhaust valves and full-flow oil filter.

High Torque 348 V8—Standard in Series 80 models (18,500- to 25,000-lb. GVW range). Provides 220 hp and 325 ft.-lbs. of torque to keep big loads moving at lowest cost. Comes equipped with scores of heavy-duty design features such as inside/outside carburetor air system that helps stabilize air supply temperature, highest quality valves and bearings, precision-engineered lubrication, cooling and ventilation systems. This one assures years of low maintenance, high mileage operation.

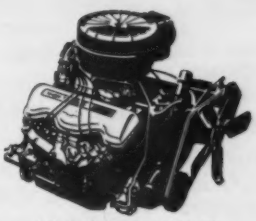
High Torque 409 V8—Optional in Series 80 models (18,500- to 25,000-lb. GVW range). It's the biggest, *pullingest* engine that ever powered a Chevy heavyweight. With a whopping 252 hp and 390 ft.-lbs. of torque, the High Torque 409 V8 is made to order for *extra* rugged runs. Long life and trouble-free performance are sure things, thanks to such special heavy-duty features as induction-hardened valve seats, forged steel crankshaft, new 4-barrel carburetor, to mention just a few. (For *all* the details on High Torque power for your job, see your Chevy dealer.) . . . Chevrolet Division of General Motors, Detroit 2, Michigan.



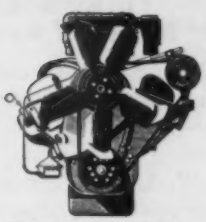
High Torque 261 Six



High Torque 327 V8



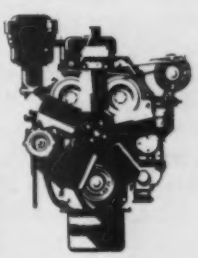
High Torque 348 V8



High Torque 409 V8

PLUS NEW GENERAL MOTORS SERIES 53 DIESELS

For '62 Chevrolet introduces new GM Diesels for medium- and heavy-duty trucks! Specially designed for lowest cost performance in Series D60 and D60-H (15,000 to 23,000 GVW) is the proved 130-hp GM 4-53 Diesel. And, for haulers who work in the Chevy Series 80 range (18,500 to 25,000 lbs.), the new 195-hp GM 6V-53 Diesel will be available soon. If you work your trucks near the limit with heavy loads, high mileages, severe stop and go or excessive idling, you're in for a pleasant shock when you find out how much a Chevy Diesel can save you!



built to keep running and running and running and running and running and running and running and running

1962 CHEVROLET JOBMASTER TRUCKS

CHEVROLET

• Christmas in midsummer—that was the theme of a program staged for handicapped children by Camp Jawonico personnel, assisted by Roc-Air, Inc., at New City, Rockland County, N.Y. In the sweltering heat Santa (Pilot Bill Barolet) swooped down among the astounded children in a helicopter, to the music of Christmas carols. Roc-Air is a subsidiary of New York Trap Rock Corporation, West Nyack, N.Y., providing that firm with chartered helicopter service.

$17,000,000 Expansion Plan Finished at Mitchell Plant Of Lehigh Portland Cement

The $17,000,000 expansion program at the Mitchell, Ind., plant of Lehigh Portland Cement Company was recently completed. Groundbreaking began in February, 1959.

The project was accomplished in two phases. The first, installation of two new kilns, ended when these began operating on January 21, 1960.

The second phase included the erection of storage, raw material-handling, and shipping facilities, and a mill building. The new finish mills went into operation on May 1 of this year, and the new raw mill on June 7. The building phase also included 30 new concrete silos for cement storage.

A new shipping office has been constructed to replace the one destroyed by an explosion last June.

Oklahoma Cement Expansion Backed by Debentures

A $3,000,000 debenture issue has been offered by Oklahoma Cement Corporation, Pryor, Okla., to raise capital for doubling plant capacity. Proceeds from the sinking fund debentures, with other funds, will finance the project, estimated at about $5 million.

The debenture prospectus describes the program as follows: doubling of grinding capacity by the addition of a new raw mill and related equipment; modification of the present mill to permit service as a finish mill as well as a raw mill, according to production needs; construction of a second kiln—11 by 375 ft.; erection of a concrete kiln feed tank, with a capacity of 8,000 bbl.; and an increase of cement storage capacity from 125,000 bbl. to approximately 300,000 bbl.

Construction Contracts Hit New Record High For Month of August

During August, renewed strength in certain areas of contracts for future construction sent the total to a record for the month, according to F. W. Dodge Corporation. Gains were made in highways and utility construction; and continued increases in apartment building were responsible for the record, despite general weakness in the nonresidential building sector. Contracts in this latter category slipped 8 percent below August, 1960.

Total contracts amounted to $3,542,567,000—up 8 percent from the same month last year. The Dodge Index rose to 293 (1947-1949=100) from 277 in July; it was 281 in June, 1961, and 276 in August, 1960. In evaluation, Dodge economists noted that this was the highest Index reading since last December, and indicates a vigorous pace of actual construction activity in the months ahead.

Residential contracts were up 11 percent from last August. Dollar valuation of contracts for apartment buildings more than doubled the year-earlier figure, while single-family housing ran just slightly ahead.

Heavy engineering was up a full 26 percent above August, 1960. Special note was made of the sharp gains recorded in streets and highways and electric light and power systems, which, in dollar volume, are the largest heavy engineering construction types.

A summary of the latest figures is given in the table below:

	August, 1961	August, 1960	% Change
Nonresidential bldg.	$ 1,087,261,000	$ 1,177,184,000	— 8
Residential bldg.	1,588,939,000	1,432,682,000	+11
Heavy engineering	866,367,000	685,351,000	+26
Total construction	$ 3,542,567,000	$ 3,295,217,000	+ 8
	8 Mo. 1961	**8 Mo. 1960**	**% Change**
Nonresidential bldg.	$ 8,205,071,000	$ 8,103,663,000	+ 1
Residential bldg.	10,844,071,000	10,347,310,000	+ 5
Heavy engineering	6,198,485,000	5,948,228,000	+ 4
Total construction	$25,247,627,000	$24,399,201,000	+ 3

February 5 to 9, 1962, are the dates for the 32nd annual convention and biennial exhibit of the National Sand and Gravel Association and the National Ready Mixed Concrete Association. Sessions will be held at the Conrad Hilton Hotel in Chicago, and the show is to be at McCormick Place.

CUT COSTS *LESS DOWN TIME AND UP-KEEP*

GIORDANO BROS. of MARKHAM, ONTARIO operate this diesel-electric Telsmith 367 Portable closed circuit crushing-screening plant. Plant mounted 60 KW Generator powers individual electric motors on conveyors and screen; simple push-button control—cut power and up-keep costs. (*Below, lower left*) Control cabinet with 3 receptacles for powering stock piling conveyors.

...get HIGH CAPACITY crushing and PRODUCT FLEXIBILITY

Crushing over 215,000 tons of granular road building material in two years, this Telsmith Portable closed circuit crushing-screening plant has had practically no down time; its single 367-S Gyrasphere Crusher still has its original manganese steel liners. ● Plant capacity is high—up to 300 tph. ● Its 367 Gyrasphere has a big ratio of reduction—7″ feed down to ⅝″, with little oversize. ● The big 4-bearing, 4′ x 12′, 2½ deck Vibrating Screen can make 3 product sizes in one pass. Sizes may be blended by simple adjustment of under screen gates. ● Crusher; Screen; 30″ conveyors, adjustable stroke Plate Feeder; Feed Hopper with removable grizzly; non-slip 84″ x 24″ Rotary Elevator—*all Telsmith heavy duty* units, the same as used in permanent plants to insure the low cost, profitable service today's commercial producers demand. For full details, get illustrated Bulletin 276. P-24-161

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Swedish Cement Technologist Wins 2nd Azbe Lime Award

Dr. Rune Hedin, manager, chemical department, Swedish Cement and Concrete Research Institute at the Royal Institute of Technology, Stockholm, is the second recipient of the annual $1,000 Azbe Award for the best technical paper on lime. This award was announced at the operating meeting of the National Lime Association, held in Washington, D. C., on October 6. The prize is presented annually to the writer of the best technical paper on lime manufacture or basic research on the properties of lime.

Dr. Hedin's prize-winning report, entitled *Investigation of the Lime Burning Process,* explains the causes for variations in the physical structure of calcium oxide. (See report on N.L.A. operators' meeting elsewhere in this issue).

Inquiries concerning the contest may be directed to the National Lime Association, 925 15th Street, N.W., Washington, D. C.

Crushed Marble Output Upped At Arizona Natural Rock Co.

Production is undergoing expansion at the marble quarry of Arizona Natural Rock Company in Bloody Basin, an area in Tonto National Forest. Output will be increased from 400 to 2,500 tons of crushed stone per week to meet a mounting demand for high-reflectance granules for low-angle roofs.

It is estimated that the 1,230,000-ton deposit of pure white marble in Bloody Basin will be sufficient for 40 years. In addition to its application in roofing granules, the rock is also used in terrazzo, as decorative landscaping chips, and in acoustical ceiling material. Paul A. Edwards is president of the Phoenix-based concern.

Lime Sold and Used in July, 1961

Lime sold and used in July, 1961 (1,022,935 short tons), decreased, compared with totals for the previous month, according to reports released by producers to the U. S. Bureau of Mines.

Decreases were reported in agricultural, construction, chemical and other industrial, and refractory lime. Open-market lime constitutes 63 percent of the total lime reported; the remaining 37 percent is captive tonnage.

Lime Sold and Used by Producers[1] in the United States, in Specified Periods of 1960-61, by Types and Major Uses in Short Tons

	June	July		January-July	
	1961	1961	1960	1961	1960
By types:					
Quicklime	841,039[2]	801,675	666,361	5,540,576	5,448,565
Hydrated lime	232,894[2]	221,260	230,227	1,491,876	1,576,637
Total lime	1,073,933[2]	1,022,935	896,588	7,032,452	7,025,202
By uses:					
Agricultural:					
Quicklime	8,233[2]	5,982	3,618	74,837	33,115
Hydrated lime	8,602[2]	6,484	5,810	65,492	64,957
Total	16,835[2]	12,466	9,428	140,329	98,072
Construction:					
Quicklime	6,574	4,675	6,580	41,758	47,903
Hydrated lime	104,992[2]	99,676	85,690	591,218	533,706
Total	111,566[2]	104,351	92,270	632,976	581,609
Chemical and other industrial:					
Quicklime	657,539	631,647	532,803	4,423,211	4,050,622
Hydrated lime	119,300[2]	115,100	138,727	835,166	977,974
Total	776,839[2]	746,747	671,530	5,258,377	5,028,596
Refractory (dead-burned dolomite)	168,693	159,371	123,360	1,000,770	1,316,925

[1] The monthly canvass excludes the output of plants producing less than 10,000 tons a year.
[2] Revised figure.

Safety Awards Received By Alpha Lime Kiln Plant

Workers at the Alpha Portland Cement Company plant at Lime Kiln, Md., recently received safety awards for 1,000 consecutive days of operation without lost-time or disabling injuries caused by accidents. J. R. D. Brown, assistant manager of the accident prevention bureau of the Portland Cement Association, Chicago, was in charge of the presentations at the award program.

F. E. Storch of the National Safety Council presented a certificate of commendation for the safe quarry operations to Glenn L. Reimel, assistant plant manager. A certificate of achievement was presented to Paul Mills, quarry supervisor, by M. Siebenthal of the U. S. Bureau of Mines. Approximately 130 employees received 1,000 Day Pins.

Natl. Safety Engineers, Inc. Acquired by Vulcan Materials

Vulcan Materials Company, Birmingham, Ala., has purchased for cash the business of National Safety Engineers, Inc., one of the nation's leading manufacturers of highway traffic signs and a major southern producer of metal stampings.

The sign firm, which had sales of about $2.5 million in its fiscal year ended February 28, will be operated as part of Vulcan's Birmingham Slag Division, under the name of Vulcan Signs and Stampings Division.

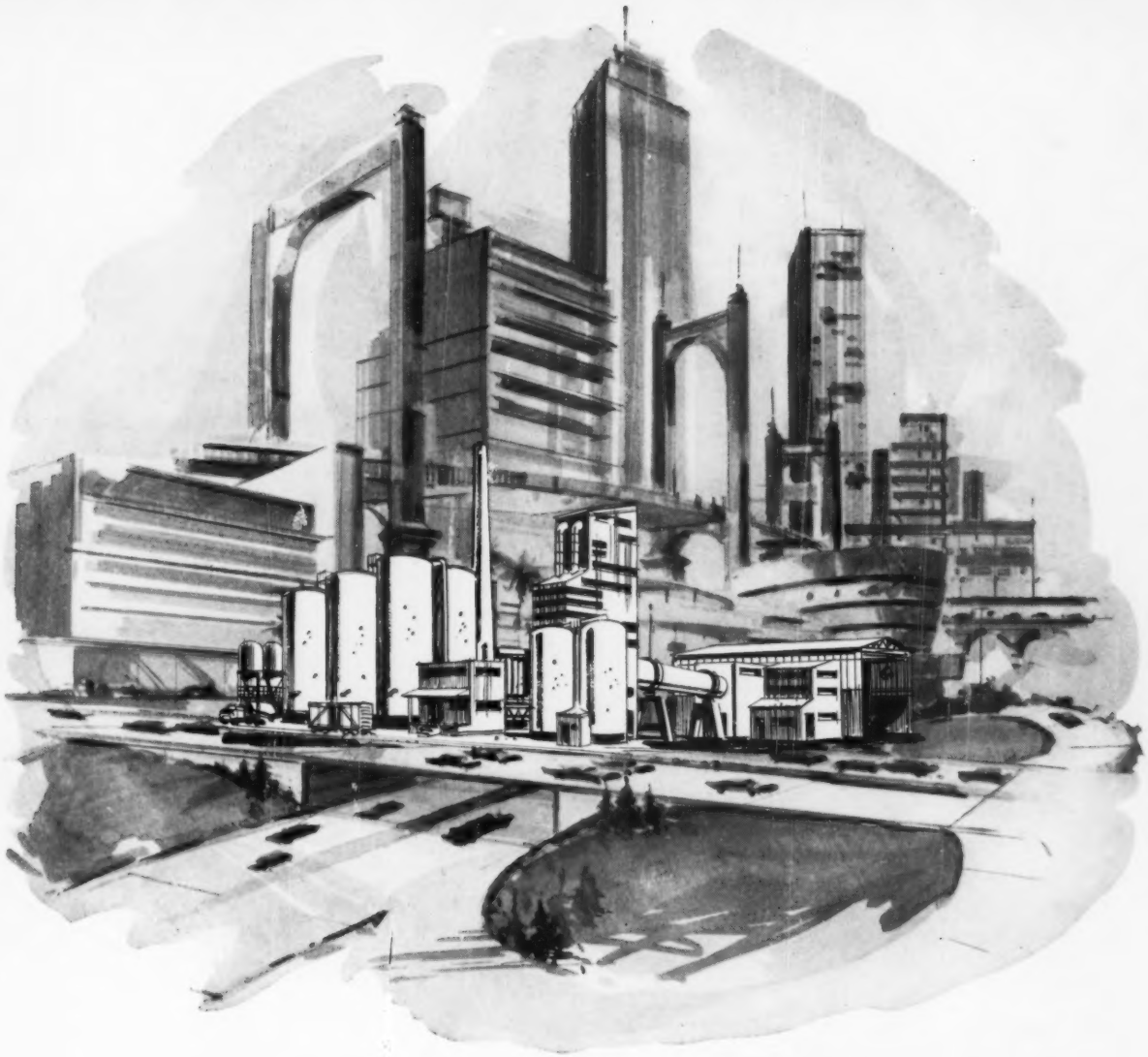
A.E.D. 43rd Annual Meeting To Be Held in Chicago

January 28 through February 1, 1962, are the official dates for the Associated Equipment Distributors' 43rd annual meeting. Headquarters will be the Conrad Hilton Hotel, with additional rooms reserved at the Sheraton-Blackstone, Pick-Congress, and Essex Inn.

A.E.D.'s conference, display, and exhibit center will be located in the South Exhibition Hall of the Conrad Hilton.

• Correction

The capacity of the Emlenton Limestone Co. plant, described in our September issue (pp. 84-88), is 300 t.p.h., not 200 to 250 t.p.h., as stated.



Feeding the roots of progress in the cement industry

Cement—the matrix of world construction—is in the USA a 1.3 billion dollar industry. Continuing technological advances keep this basic industry efficient, competitive and responsive to changing requirements in building and construction. Fuller Company, whose pneumatic materials handling and process equipment figures in a wide range of industries, plays an important role here.

In more than 35 years of growing *with* the industry, Fuller has pioneered manufacturing innovations now standard in the field . . . techniques and equipment that have influenced vast improvements in the design of entire cement-producing plants. In these years Fuller has built an *integrated* organization—Dracco Division, Traylor Engineering & Manufacturing Division, Sutorbilt Corporation and Lehigh Fan and Blower Division. They are combined to provide the cement industry everywhere with advanced research, with the design and manufacture of equipment for crushing, grinding, preheating, burning, cooling, blending, heat transfer, conveying, dust collection and process control. Fuller is now able to undertake contracts for complete new plants for cement manufacturing and for the modernization of older ones.

Fuller is more than ever qualified today to help cement producers keep cement competitive in prices and quality with existing alternate materials and those to come. For more details on Fuller's capabilities, write today.

2880
G-245

See Pit & Quarry Handook for details and specifications.

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SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION • OFFICES IN PRINCIPAL CITIES
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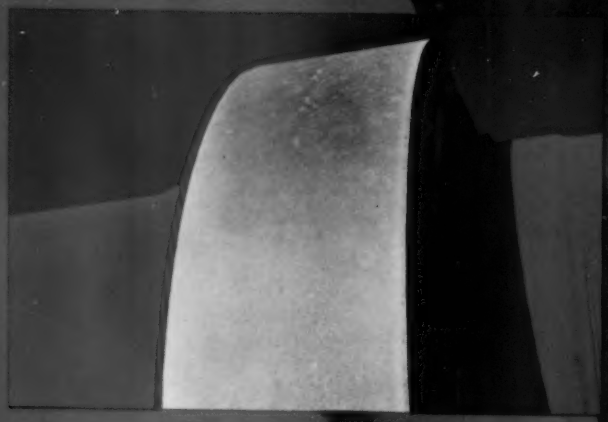
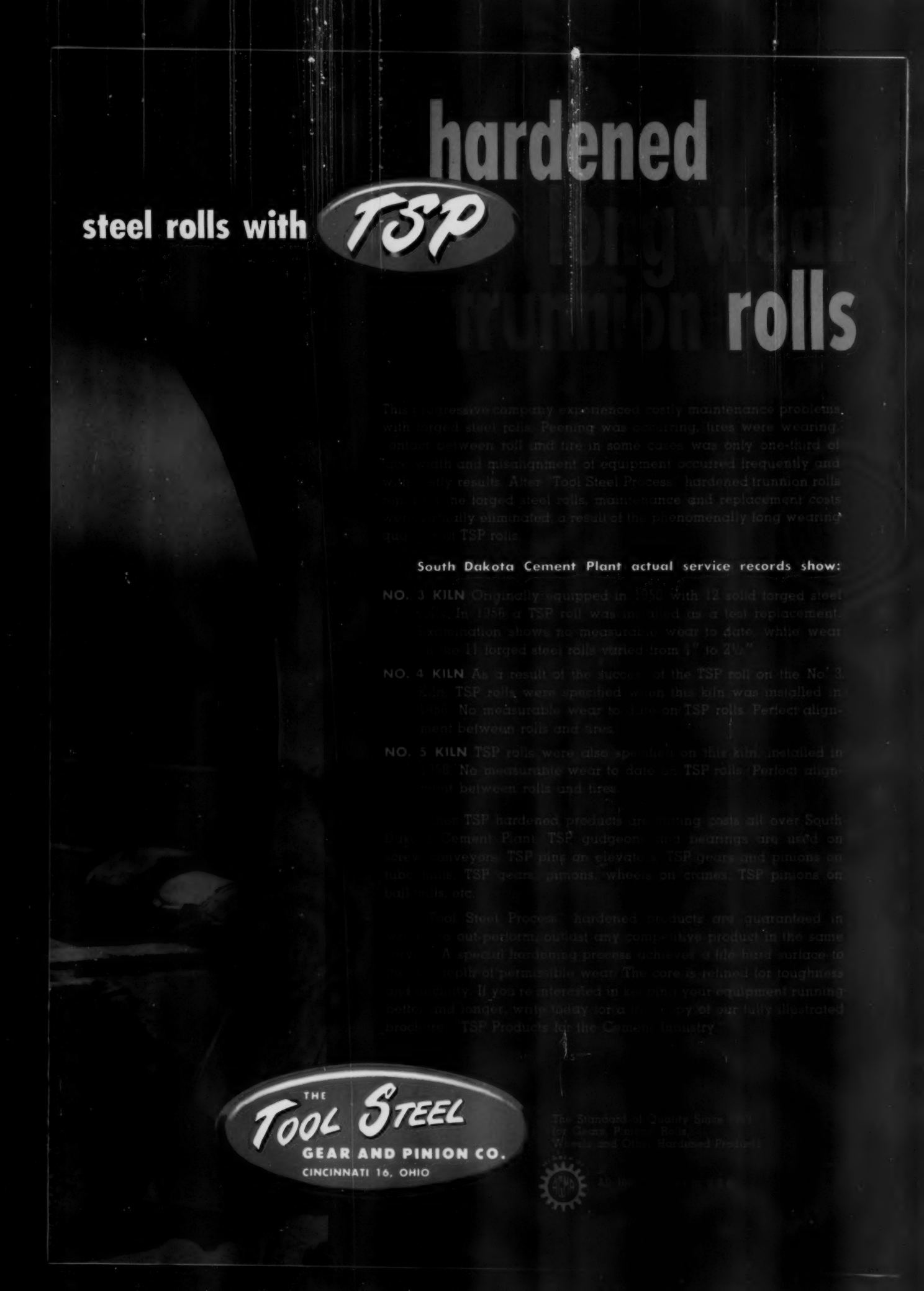
South Dakota Cement Plant replaces solid forged

TSP Thrust roll (on left) and trunnion roll, one of 12 on the No. 5 kiln. Note the perfect condition of both rolls and the superb condition of the mating tire. No visible wear in over two years of continuous service.



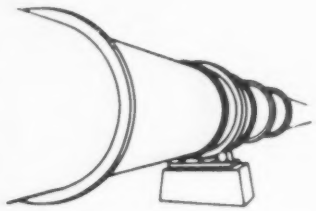
Close-up of a tire mating with a TSP trunnion roll. The smooth surface of the hardened TSP roll keeps the soft mating tire from wearing. More service miles for both.

TSP Thrust roll on kiln. The perfect condition, the fact that there is no visible wear, is characteristic of all thrust rolls on South Dakota Cement Plant kilns.

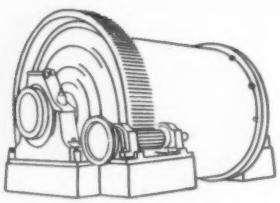

steel rolls with TSP
hardened
rolls

TRAYLOR EQUIPMENT

for the mining and process industries

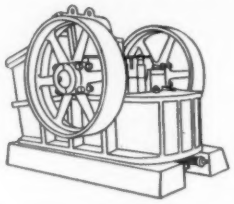


TRAYLOR ROTARY KILNS AND SLAKERS . . . the excellence of design and engineering of Traylor kilns is a result of over 58 years' experience in the manufacture of specialized machinery for the mining and process industries. Kiln shells are automatically welded of heavy steel plate. Alignment is maintained by easily adjusted supports. Full-floating type riding rings are of forged or cast steel, mounted on machined pads. Steel main gears and pinions are machined on a special gear generator. Kilns are designed and engineered to meet your specifications. Traylor has the most extensive research facility now available in the industry to insure delivery of process-perfected equipment to you.

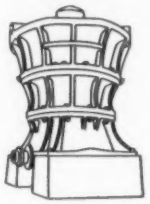


TRAYLOR BALL AND COMPARTMENT MILLS . . . **BALL MILLS** in both overflow and diaphragm discharge types have shells of welded steel with detachable heads of cast steel.

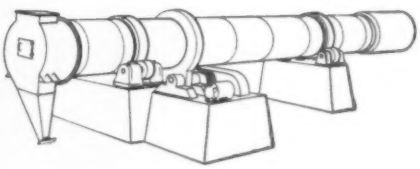
COMPARTMENT MILLS . . . partitioned by slotted diaphragms, these mills allow progressive reduction of products as it passes through different grades of grinding media within the mill, thereby reducing the amount of handling necessary in product reduction.



TRAYLOR JAW CRUSHERS . . . feature the original curved jaw plates for greater capacities at finer settings and longer life of the wearing plates. The swing jaw is made of cast steel of extra heavy design and the pitman shaft is of annealed open hearth forged steel, for lightness with great strength. Maintainence and inspection are simplified by the design which makes all parts readily accessible.



TRAYLOR GYRATORY CRUSHERS . . . Traylor is world famous as the manufacturer of giant 60″ gyratory crushers, secondary reduction crushers and fine reduction crushers. Crushers are designed with Traylor's original non-choking, self-tightening bell heads and curved concaves for large tonnage of small product and uniform size with a low percentage of waste and fines. Power applied as a direct crushing force offers greatly reduced power requirements at every setting.



TRAYLOR COOLERS . . . manufactured in diaphragm and multiple tube design, receive the same care in design and construction as Traylor kilns.

TRAYLOR SLURRY FEEDERS AND TABLE FEEDERS . . . **SLURRY FEEDERS** are self contained, fully closed ferris wheel type feeders . . . accurately supply a constant volume of slurry to kilns and mills. Single welded tank and hopper units are available in sizes from 36″ to 84″.

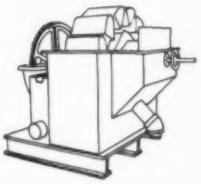
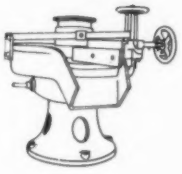


TABLE FEEDERS . . . accurately regulate the flow of material to mills, kilns and dryers. The revolving table receives material at its center from an adjustable feed spout. Feeders available from 2′ to 10′ in diameter.



See Pit & Quarry Handbook for details and specifications.

TRAYLOR ENGINEERING & MANUFACTURING

DIVISION OF FULLER COMPANY

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4172
TGA-3

•This 358-ft. barge recently left Milwaukee, Wis., bearing seven sections of a new 460-ft. rotary kiln, plus accessory equipment, destined for Huron Portland Cement's Michigan plant. The sections were shipped by water by Allis-Chalmers Manufacturing Company to Alpena, Mich., because of their size. One 85-ft. piece weighed 86½ tons.

The new kiln, which is expected to be in operation by mid-1962, will add 2,000,000 bbl. to the annual capacity of the Alpena plant, for a total of 14,000 000 bbl. It is a part of a $72,000,000, 15-year expansion program announced by the National Gypsum Company for its Huron Portland Cement Division.

The kiln will be fitted with the latest type of dust control equipment, and will be the first such Michigan installation to use the new Nucontroller bed depth control. By means of this system the speed of the cooler is automatically regulated according to the depth of the clinker in the cooler at the discharge end.

1960 Sand and Gravel Output Drops First Time in 11 Years

Sand and gravel production in 1960 declined for the first time since 1949. Output, as reported to the U. S. Bureau of Mines, totaled 707,000,000 tons, valued at $719,000,000—a drop of 3 percent in volume and 1 percent in value below 1959. Lower demand for building construction and paving accounted for most of the decline.

California continued to lead in production, followed by Michigan, Ohio, Wisconsin, Illinois, New York, Minnesota, and Texas, in that order.

Commercial production—Output of sand and gravel reported by commercial producers totaled 523,000,000 short tons, compared with 535,000,000 in 1959.

- Industrial sand production (including ground sand) totaled 18,000,000 tons—a decrease of 5 percent from 1959.
- Glass sand production totaled 6,400,000 tons, with an average value of $3.35 per ton—an increase of 3 percent in quantity and 7 percent in total value.
- Molding sand output totaled 6,000,000, valued at $16,000,000—a decline of 3 percent in volume but an increase of 6 percent in value.
- Grinding and polishing sand (including blast sand) declined both in volume and value.
- Fire or furnace sand output totaled 559,000 tons, valued at $1,214,000—a slight increase in tonnage and value.
- Engine sand production totaled 890,000 tons, with an average value of $1.89 per ton.
- Filter sand output totaled 269,000 short tons—a decline of 32 percent; the average value was $2.32 per ton.

Other production—Sand and gravel production by government and contractor operations totaled 185,000,000 short tons.

1960 Canadian Limestone Output Decreases from 1959 Production

Although Canadian limestone production remained at a high level during 1960, it was substantially below that of 1959, the record production year. About 450 quarries were in operation in all provinces except Saskatchewan and Prince Edward Island.

A total volume of 10.2 million tons of limestone were quarried for the production of cement and lime. Shipments for purposes other than the production of cement and lime amounted to 34.6 million tons, valued at $43.1 million, as compared with 36.7 million tons, valued at $46 million in 1959.

During 1960 the output of limestone for noncement and nonlime purposes decreased sharply in Quebec, the leading producer in 1959; in British Columbia it increased notably but amounted to only half the output of 1956, the peak year.

The trade in all types of crushed stone between Canada and the United States is large for such a low-priced commodity. In 1960, Canada imported 905,102 short tons of broken, crushed, and ground limestone from the United States and exported 121,449 short tons of the same material.

Chemical-grade limestone is exported mainly from British Columbia, Alberta, and Ontario, and imported chiefly into Ontario and British Columbia. The bulk of the trade is in crushed limestone for construction purposes and is mainly between Ontario and the United States.

A joint study of large-scale potash production possibilities in Saskatchewan, Canada, was recently undertaken by U. S. Borax & Chemical Corp. and the Homestake Mining Co. U. S. Borax has had an investigating permit in the Canadian province since 1957.

Operations began recently at the new plant of Buildex, Inc., near Marquette, Kans. Although the installation of crushers and conveyors has not been completed, shale is processed in the kilns, and the semifinished material is stockpiled.

LUBE LOGIC

Five tips on

Don't let girth-gear teeth lose their bite

One of the toughest lube problems in a cement mill is keeping the girth gear and drive pinion on a rotary kiln properly lubricated.

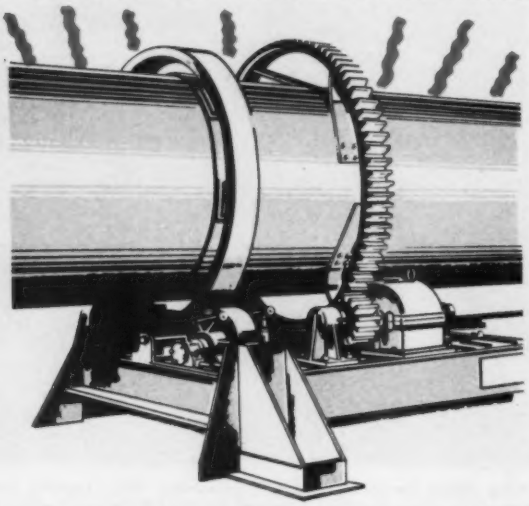
The main problem is heat, radiated from the hot shell of the kiln to the driving machinery. Sometimes girth gears get so hot that the lubricant runs off like water.

In addition to heat, dust and grit are a problem. Both tend to dry out the lubricant, and to set up an abrasive layer between the contact surfaces of the gears.

The only safe solution is a lubricant with *all* these properties:

1. High liquefying point, so the lubricant maintains a protective film between the sliding surfaces of the gears even at high temperatures.

2. Pronounced adhesiveness, or stickiness, so the grease stays on the sliding surfaces, where wear occurs, instead of running off.

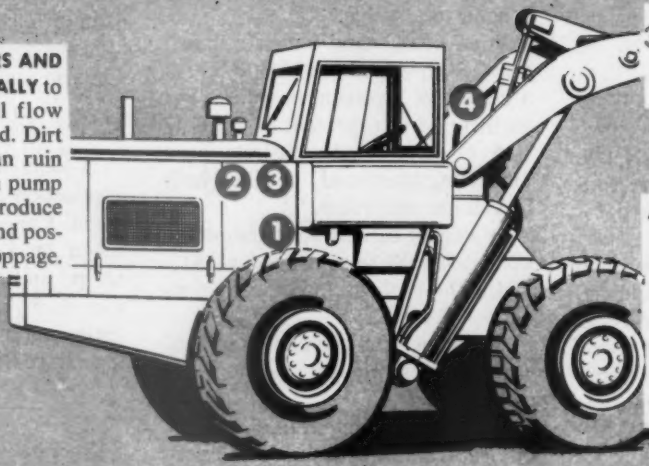


3. Proper body, or thickness, to withstand heavy loadings and prevent abrasive contaminants from chewing up gear surfaces.

Since gear loadings, temperature and other characteristics vary from one kiln to another, your best bet for getting the right lubricant for the job is to ask the Texaco Lubrication Engineer. He's had a lot of experience with kiln-lubrication problems, and he can suggest exactly the right lubricant to lick the problem in your equipment.

Four-point check for top hydraulic performance

1 **CLEAN OIL FILTERS AND SCREENS PERIODICALLY** to make sure the oil flow isn't being restricted. Dirt in hydraulic oil can ruin close tolerances on pump and valve parts, produce erratic operation and possibly complete stoppage.



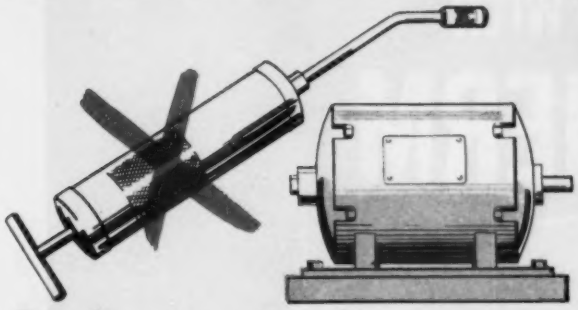
3 **KEEP RESERVOIR BREATHER CLEAN.**

4 **KEEP RUBBER HOSES FREE OF CRIMPS.** Kinks in flexible lines restrict oil flow. Also, kinked spots wear fastest, and particles of rubber may break off into the oil, plug the filter or make moving parts stick.

2 **KEEP OIL AT CORRECT LEVEL** in reservoir. Low oil level admits air into the system. Air makes foam, and foam produces erratic operation, loss of power, "creep" from set position.

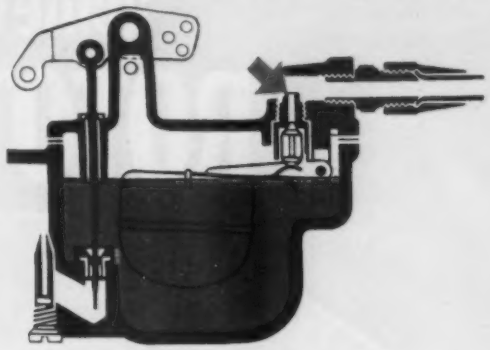
ABOVE ALL, make sure you're using the right grade of hydraulic oil. Using the wrong viscosity (too thick in cold weather or too thin in hot weather) leads to foaming, noisy pump operation and pump overheating.

extending equipment life



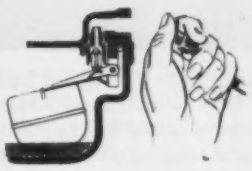
Don't use gun for grease-lubricated motor bearings

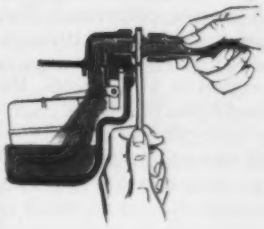
Most electric motor bearings are pre-packed with grease at the factory, either by the bearing or motor manufacturer. If re-lubrication is specified for grease-lubricated bearings, the only right way to do the job is the same way it's done at the plant: with the motor disassembled. Even if the motor has a grease fitting, don't try re-lubricating them with a grease gun. It's practically impossible to gauge accurately how much grease you're pumping into the motor bearings, and over-lubrication almost always leads to leakage of lubricant and damage to the armature and commutator. Moral: if you do have to re-lubricate a grease-lubricated electric motor, disassemble the motor, wash the bearings thoroughly in a solvent, and repack the bearings by hand.



Quick cure for carburetor flooding

Repeated stalling and hard restarting is often caused by a tiny particle of grit, which lodges under the carburetor float needle valve, lets too much gasoline into the carburetor and causes flooding. You can cure this problem (sometimes permanently) with the following routine: disconnect the fuel line at the carburetor and plug it with a cork, a pencil or anything else that will fit. Then run the engine until you've used up all the fuel in the carburetor. Re-connect the fuel line, crank the engine, and the rush of gasoline into the empty carburetor will usually flush the foreign matter out of the needle valve seat. If you have a friend but no cork, have the friend start the engine while you plug the disconnected line with your thumb. Same difference.





Protect diesel fuel injector with periodic tank drains

Dirt and water in diesel fuel can ruin a fuel injector in no time. Even if you keep the fuel clean during storage, there's still a good chance that temperature changes will create enough condensation in the fuel tank on your rig to start rusting in the injectors. Several operators have pretty well solved this problem by partially draining the fuel tank once or twice a week. Simply draw off about a gallon of fluid through the drain valve at the bottom of the fuel tank. You lose some fuel this way, but you also get the accumulated water and other contaminants clear out of the fuel system. The cost of the fuel you drain off is a small loss compared to the repair bills you can save on the fuel injectors.

TEXACO LUBRICATION ENGINEERS

Every month or so we'll bring you a batch of "sleepers," little angles, so easy to overlook, where big savings in money and time can be made. If Lube Logic doesn't solve your problem, call your local Texaco Lubrication Engineer. Anytime, all the time, he's your best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control." Texaco Inc., 135 East 42nd Street, New York 17, N.Y.

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TEXACO

Throughout the United States

Canada • Latin America • West Africa

Successful Rotary Kiln Insulation achieved with ROTOTHERM

ROTOTHERM, the strong lightweight brick singular in its combination of properties which are particularly suited for the insulation between rotary kiln shells and hard refractory brick linings. Most significant among these desirable qualities is its characteristic of slight surface compressibility with unusual resistance to pressure rubbing. Although ROTOTHERM is strong, it is not brittle and when subjected to pressure and abrasive action in kiln linings, the surface in contact with the hard refractory brick tends to compress very slightly rather than abrade away.

The momentum and inertia which occurs on stopping and starting rotation of a kiln is accompanied by slippage tendency and friction—causing abrasion. It is this factor which ROTOTHERM satisfactorily withstands.

This property is illustrated by the following simple test:

Brick were held together opposite each other with equal bearing against a revolving steel ball. Depressions illustrate relative resistance to pressure rubbing.

OTHER PROPERTIES OF MAJOR IMPORTANCE FOR THIS APPLICATION:

TEMPERATURE LIMIT	1600°F.
DENSITY—AVE.	51 P.C.F.
COLD CRUSHING STRENGTH	1400 P.S.I.

Relative insulating value of ROTOTHERM—3″ equals approximately 12″ of dense fireclay brick.

Years of gratifying experience with ROTOTHERM in this use of insulating rotary kilns provide the most dependable criteria of its durability and economical use. Write for further details.

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World's Most Complete Refractories Service

HW 61 11

Marquette's Reginald Holladay (left) chatting with his famous double in Hollywood.

Marquette's Chief Chemist Becomes a Part-Time TV Star

Reginald Holladay, chief chemist at the Superior, Ohio, plant of Marquette Cement Manufacturing Company, recently stepped briefly from his familiar role and strode on stage before the TV camera of the Andy Griffith show.

His appearance was the result of a letter written by the girls at the Rockmart, Ga., Marquette plant, where Mr. Holladay was once a labman. The writers had nominated him in a nationwide contest to find a double for Andy Griffith. He won the contest and also a holiday in Hollywood.

The week in Hollywood brought adventures and visits with TV and stage personalities that made Marquette's chemist a topic of conversation in his home town. His company devoted six pages of the August issue of *Cementopics*, the Marquette house organ, to a pictorial coverage of the event.

Owner's Invention Featured In N. D. Sand-Gravel Plant

At Lisbon, N. D., operations of the Lisbon Sand and Gravel Company began recently on a six-day-a-week schedule. Products are sand, shale, and gravel, the latter for use as concrete aggregate. Capacity is 60 t.p.h. of aggregate, plus sand and shale.

One unit of the plant, a jig for separating the shale from the other materials, was designed and patented by Ted Garland, one of the partners of the firm. The jig reportedly produces 99 percent shale-free material.

Deposits along the Sheyenne River, on which the 60-acre plant is located, are said to contain reserves of raw material sufficient for "the next hundred years."

In addition to Mr. Garland, who is vice-president, the officers are M. A. Halverson, president; Donovan Stetson, secretary; and W. E. Chisman, treasurer.

Social Security Tax Rising— C. of C. Points to Huge Bill

According to the *National Chamber Washington Report,* issued by the Chamber of Commerce of the United States, Social Security taxes not only will be higher next January, there will be further increases in 1963, 1966, and 1968. The 1962 tax boost is needed to finance added benefits approved by Congress during the last year. Those scheduled for the other three years will be required to pay for benefits provided by earlier amendments.

Conservative estimates made by sponsors of a drive to revise the Social Security purposes by including health care benefits admit that this proposal would cost more than $1 billion in new taxes. National Chamber spokesmen believe that this move would be "the entering wedge for complete federalization of health and medical care services."

Employers are alerted by C. of C. that by 1968 the maximum Social Security tax will be $222 from each employee, plus an equal amount from the employer.

Critical Zoning Problem Decision To Be Reviewed by Supreme Court

In a critical area of litigation pertinent to all aggregate producers, the Supreme Court has granted review of the New York Court of Appeals significant decision in the case of *Goldblatt* v. *Town of Hempstead*. Prior to that decision, the events noted below took place.

Builders Sand and Gravel Company, which has been in business at its present location for many years, has excavated a number of acres of its property to a depth that requires going below the water table for further recovery of materials. After previous efforts of the town's zoning board to terminate the company's operations had failed, and in the face of a 1956 judgment holding that the firm's excavation and dredging constituted a prior nonconforming use, the board nevertheless amended the zoning ordinance to prohibit *all* excavation below the water table, and to require the *filling in of excavations previously made*.

The effect of the ordinance was to prohibit the sand and gravel company from further conduct of its business. In addition, the cost of filling in its previous workings would be *more than $1 million*.

Despite the fact that the ordinance prohibits the firm from engaging in business and that it "makes an act lawful when done criminal," the New York Court of Appeals (three judges dissenting) sustained the ordinance as a valid exercise of the town's statutorily delegated police power.

The two questions which the Supreme Court has agreed to decide in the review granted to Goldblatt and the company are these:

1. Does the ordinance violate the due process clause of the Fourteenth Amendment of the Constitution of the United States (a) insofar as it takes away Goldblatt's and the company's property and business without payment therefor; and (b) because it overrules and sets aside vested rights of Goldblatt and the company established by a judgment?

2. Does the ordinance violate the constitutional prohibition against *ex post facto* laws insofar as it provides criminal sanctions and punishment for doing acts which were legal when done?

It is anticipated that the Supreme Court will hear arguments on the New York court's decision before the end of this year.

No. 4 in a series of announcements on new **HOUGH** *machines*

This new H-120 Series "B" PAYLOADER has many

improvements

which give added capacity, more digging power, better stability, lower maintenance and increased production

Since its introduction two years ago, the H-120 PAYLOADER has been acclaimed by contractors, materials producers, industrial users and their operators, for its reliable performance, high production and ease of operation.

Now, HOUGH'S continuous program of research, development and refinement has made this series "B" model an even better investment.

Added Capacity: Operating capacity is increased by 25% to 15,000 lbs. and bucket capacity is increased by 17% to 5 cubic yards. (S.A.E. rated)

Extra Stability: To supplement the increased capacity extra stability and balance have been achieved with a longer wheelbase, wider tread and continued use of dry ballast (100% heavier by volume than liquid) in rear tires which gives a lower center of gravity.

More Hydraulic Capacity: The capacity of both the main hydraulic pump and the steering pump has been increased, a total of 22%. This provides more reserve hydraulic power for lifting and breakout action and assures easy steering action even when the engine is idling.

More Digging Power: The increased hydraulic capacity and refinements in the boom geometry provide greater mechanical leverage for digging while maintaining lifting speeds.

Lower Maintenance: The loader mechanism features the same simplified design with a single bucket tilt cylinder and a minimum of pivot and grease points and fewer parts to service and maintain. There are actually from 4 to 10 fewer pivot points than on competitive units. Furthermore, all boom, bucket and steering pivot points have "O" rings or other seals to keep grease in and dirt out. A set of only three different hoses will service the entire loader hydraulic mechanism.

PAYLOADER is convertible to this D-120B PAYDOZER

Keep-clean Hydraulic System: A valuable and exclusive HOUGH feature is the closed and pressure-controlled hydraulic system to keep out air-borne dust and moisture. The new cylindrical, vessel-type reservoir has extra strength and the entire top is easily removed for thorough servicing. There is a full-flow filtering system with three micronic filters.

"No-Stop" Full Power-shift Transmission: This HOUGH-built transmission is thoroughly proven to be without equal in the tractor-shovel industry. It is full-reversing, constant-mesh with four speed ranges in each direction. All shifts, up or down, forward or reverse, can be made "on-the-go" without stopping for any "range-shift" engaging of gears.

Convertible to a 'Dozer: The H-120 Series "B" has many other features and advantages, many of which are exclusive. These include the ability to convert it, quickly and economically, to a powerful pusher-dozer. With its 300 hp engine, high dumping clearance and long reach it is the best buy in big tractor-shovels.

Your HOUGH Distributor is ready to prove it to you.

THE FRANK G. HOUGH CO. 11-8-1
750 Sunnyside Ave., Libertyville, Ill.

☐ **Send full data on the H-120 B PAYLOADER**
☐ **Send full data on the D-120 B PAYDOZER**

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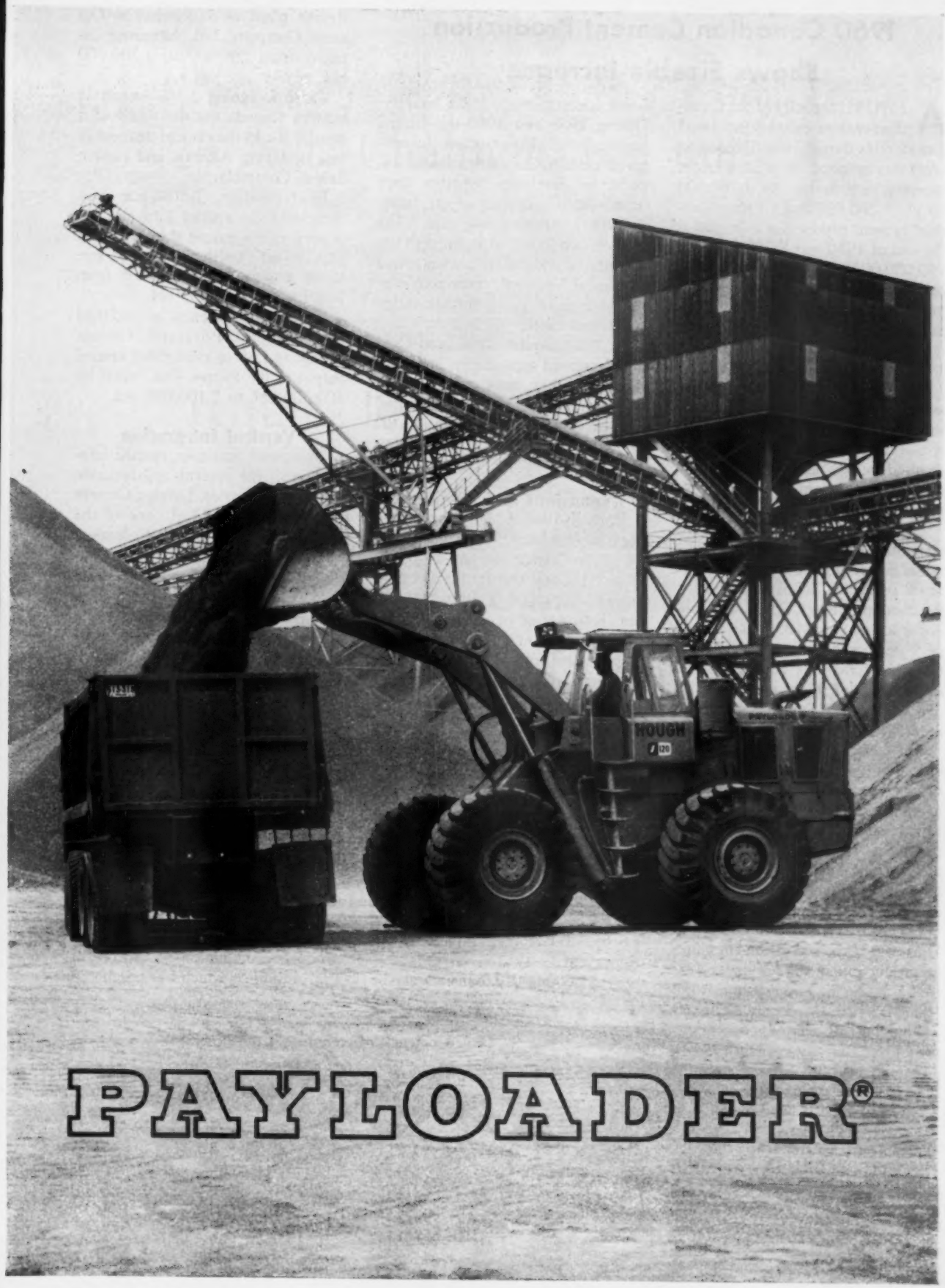

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1960 Canadian Cement Production Shows Sizable Increase

ANNUAL capacity of the Canadian cement industry increased considerably during 1960. Expansion programs resulted in a 17 percent increase, amounting to 1,260,000 t.p.y. (7,200,000 bbl.). Rated annual cement production capacity at the end of 1960 was 8,750,000 tons (50,000,000 bbl.). Excess annual capacity (3,052,141 tons) was 53.6 percent of 1960 production, and approximated the increase in apparent domestic cement consumption from 1948 to 1960.

The Montreal area received the largest expansion; plant capacity there now exceeds demand. The increase in Alberta and Saskatchewan resulted mainly from other types of construction now in progress or proposed.

For the first year since 1947, the Canadian cement industry did not attain record production. It operated at 68 percent of its actual capacity. Production totaled 5,697,859 tons —the lowest since 1956, and a drop of 9 percent below 1959. This reflects a decrease in the cement requirements of both the Canadian and the United States construction industries during 1960.

Most of the production drop occurred in Ontario, where output dropped 18 percent from 1959. Manitoba, Saskatchewan, and Newfoundland showed small gains; other provinces showed reduced shipments. The output of Ontario and Quebec represented 66 percent of all shipments.

Nineteen plants, containing 45 kilns, were involved in cement clinker production in all provinces (except Nova Scotia and Prince Edward Island). Also, two separate clinker-grinding plants were in operation: the Clover Bar, Alta., plant of Canada Cement Company, Ltd., and the Paris, Ont., plant of Medusa Products Company of Canada Ltd.

Exports and Imports

Exports since 1955 have been noteworthy. Value of exports rose to $2,821,007 (or 3 percent of the value of production) during 1960, shipments going almost entirely to the United States. This has caused some concern in the latter country. During 1959 and 1960 the United States Tariff Commission investigated certain Canadian cement exports to determine whether they were sold in violation of the International Antidumping Act. The commission found no violation; U.S. imports of Canadian cement were 0.5 and 0.3 percent, respectively, of the volume of U. S. shipments for 1959 and 1960.

In 1957, cement imports to Canada decreased appreciably, and since that time they have continued to diminish. They are mainly of special types, coming chiefly from the United Kingdom, the United States, and West Germany.

Expansions and Additions

Early in 1960, a highly automated plant was brought into production by Miron Ciment Inc. at St. Michel, Que. This one-kiln facility, with an annual rated output of 4,000,000 bbl., is surpassed in capacity by only one other plant in Canada. The Miron plant follows a recent Canadian trend towards the use of dry processing; it employs the largest dry-process rotary kiln in the Western Hemisphere. The kiln is 15 by 550 ft. long and is operated entirely by automation (see PIT AND QUARRY, July, 1961, p. 136).

At midyear a $4,500,000 expansion, which increased annual output from 2,200,000 to 3,400,000 bbl., was completed at the Edmonton plant of Inland Cement Company Ltd. The addition included a new 11- by 340-ft. rotary kiln and related equipment.

A $1,000,000 expansion at the Regina plant of Saskatchewan Cement Company Ltd. increased capacity from 800,000 to 1,300,000 bbl.

These foregoing developments in western Canada are the result of a general rise in the cement demand in Saskatchewan, Alberta, and eastern British Columbia.

In November, installation was completed on a third kiln and accessory equipment at the St. Basile, Que., plant of Ciment Quebec Inc. Rated capacity was raised from 700,000 to 1,800,000 bbl.

Improved efficiency permitted Lake Ontario Portland Cement Company Ltd. to raise rated annual output at the Picton, Ont., plant by 400,000 bbl. to 2,100,000 bbl.

Vertical Integration

The trend continues toward integration of the cement and concrete products industries. Lafarge Cement of North America Ltd., one of the two producers in British Columbia, has acquired control of Anglo Canadian Cement Ltd., and Deeks-McBride Ltd. and affiliated companies. The latter two produce ready-mix, sand and gravel, and concrete products in British Columbia. Lafarge Cement has also acquired a substantial interest in the three ready-mix plants of Island-Ready-Mix Limited, on Vancouver Island.

United Asbestos Corporation Ltd. purchased control of Thorold Concrete Products Ltd., Thorold, Ont.; Capital Concrete Products Ltd., Iroquois, Ont.; and Transit Mixed Concrete Ltd., St. Catharines, Ont.

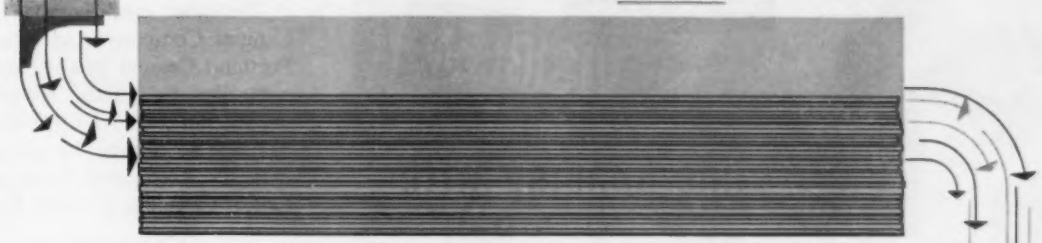
A substantial amount of foreign capital was invested in two major cement companies. One of these was the integrated group of construction products companies of Miron et Freres Limitee, which was purchased

1960 Cement Production in Canada

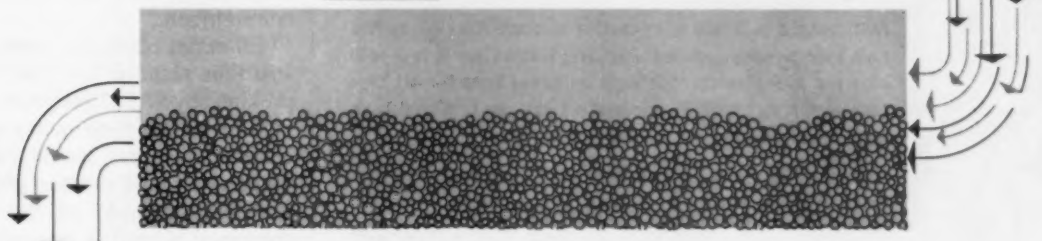
	1960*		1959	
	Short Tons	$	Short Tons	$
Ontario	1,945,960	29,661,771	2,386,334	31,731,767
Quebec	1,835,569	26,741,191	1,975,452	29,520,710
Alberta	677,075	11,827,000	689,854	11,678,577
Manitoba	426,475	8,042,000	402,562	7,314,552
British Columbia	384,330	6,337,900	427,181	7,049,638
Saskatchewan	170,625	4,237,000	161,057	3,954,737
New Brunswick	167,825	2,618,000	170,793	2,606,301
Newfoundland	90,000	1,647,000	71,253	1,291,516
Total	**5,697,859**	**91,111,862**	**6,284,486**	**95,147,798**

*All 1960 figures are subject to revision.

Allis-Chalmers rod mills

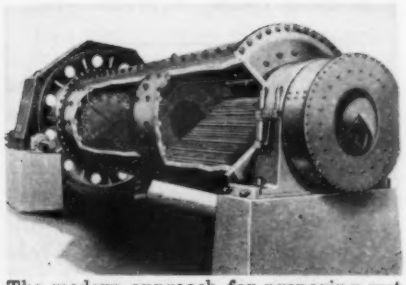


require less labor and power



to grind a more uniform product

for better rotary kiln feed



The modern approach for preparing wet kiln feed in open circuit. The first compartment contains rods to closely size the material for following ball compartment.

Allis-Chalmers engineers and builds rod mills, *Ballpeb* compartment-type ball mills, and *Rodpeb* combination rod-and-ball mills. Write to Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

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FAST, because in a minute or two the spectacle plate is reversed from open to closed position. POSITIVE, because you have a solid plate seal. EASY, because the flanges are spread by backing-off three bolts with a bar. VISIBLE*, because you can see from a distance which blinds are open and which closed.

With HAMER Line Blind Valves on your silo loading lines, there is no danger of contamination . . . no costly multi-man operation to blind the lines . . . no possibility of the valves wedging, sticking or jamming. There is practically no maintenance required and they are unsurpassed for easy operation, long life and resistance to abrasion.

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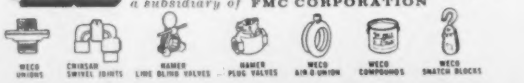

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for $50,000,000 in mid-1960 by Cimenteries et Briqueteries Reunies, a subsidiary of Societe Generale de Belgique. This group, which includes the cement plant formerly owned by Miron Ciment Inc. (at St. Michel, Que.), now operates as Miron Company Limited.

The other case involved Canada Cement Company, Ltd. Associated Portland Cement Manufacturers, controlled by United Kingdom interests, purchased 10 percent of the outstanding shares for about $5.4 million. Associated Portland owns British Columbia Cement Co. Ltd.

Consumption

Construction expenditures in 1960 dropped 2.7 percent to $6,889,000,000, accompanied by a 7.8 percent drop in apparent domestic cement consumption.

Estimates place the value of construction planned for 1961 at approximately $7,132,000,000—a new high. If these estimates are realized, cement shipments should rise 5 to 10 percent above those in 1960.

About one-third of the cement consumed is used in concrete products; in 1958 the figures amounted to 2,117,500 tons of cement. Products involved include ready-mix, concrete block, brick, pipe, tile, etc.

The use of cement in soil cement (a mixture of cement and clay or gravel) is increasing. Until 1960 such use was sparing. During 1960, more than 100 miles of roads were improved with soil cement.

To supply the lime requirements of the basic oxygen steel plant of the Colorado Fuel & Iron Corporation at Pueblo, a $2,500,000 lime plant is being built there. The 100-t.p.h. steel facility, recently completed, is already in production.

The Limestone Division of the Wallick Coal Company opened a plant recently two miles east of Strasburg, Ohio, with a capacity of 250 t.p.h. The facility was reported to have cost about $500,000. Officers of the corporation are Clyde A. Wallick, president; James A. and Clyde J. Wallick, vice-presidents; and Mrs. Clyde Wallick Sr., secretary-treasurer.

Obituaries

WILLIAM B. HOLLAND, general superintendent of the Arkhola Sand and Gravel Company, Fort Smith, Ark., died recently in a local hospital. He was 53 years old.

PERCY P. TYLER, 79, former president of Gypsum Lime and Alabastine Ltd. of Canada, died recently in Toronto, Ont. He retained the position of director of the company until recently.

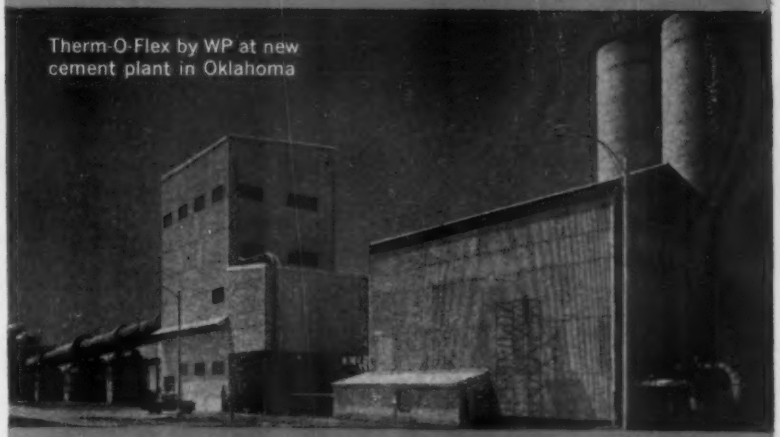
D. L. LATHAN, 67, Greenville, N. C., district sales representative for M. J. Grove Lime Company (a division of Flintkote Company), died recently in Frederick, Md., where he was attending a home-office business conference of his company.

E. W. HIGHTOWER SR., 79, a former vice-president of Georgia Marble Company, Tate, Ga., died recently at the home of his son in Alcoa, Tenn. He had retired from the company in January. (Georgia Marble produces crushed limestone and crushed marble.)

HOWARD S. PONZER, vice-president in charge of engineering and development, the Giant Portland Cement Company, Philadelphia, died unexpectedly on August 21 1961.

Mr. Ponzer joined the Giant Company in 1949 as superintendent of the company's Harleyville, S. C., plant. He had held his latest post since 1952. Earlier in his career he had been affiliated with the Portland Cement Association in various capacities. He had also been associated with the Missouri Portland Cement Company and the General Portland Cement Company. He was superintendent of General's Houston plant from 1945 until October, 1949.

Mr. Ponzer was a member of the General Technical Committee of the Portland Cement Association.



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An inquiry—on your business letterhead—will bring you literature promptly. Just write Western Precipitation, 1000 W. 9th St., Los Angeles 54, Calif. (In Canada, write 8285 Mountain Sights Ave., Montreal, P.Q.)

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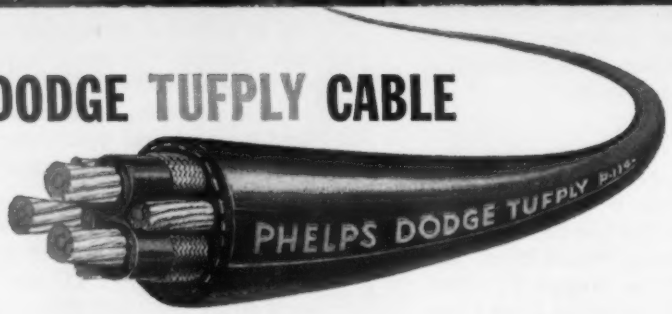

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World Wide Cement News

India—Cement productive capacity, reported at 9,130,000 tons, will be increased by about 3.41 million tons during the first two years of the Third Five Year Plan. The Ministry of Industry has announced the licensing of eight new plants and the expansion of 17 existing facilities during fiscal years 1961-62 and 1962-63.

The new operations will be located in the following states: Andhra Pradesh, Assam, Gujarat, Jammu, Kashmir, Madhya Pradesh, Madras, Maharashtra, and Mysore.

Jordan—The first extension of the Jordan Cement Company plant was completed in mid-1960, resulting in an increase of daily productive capacity to 500 tons and a 50 percent increase in cement output in 1960. (Total estimated output: 165,000 metric tons.) A second extension to the plant is under construction.

Taiwan (Formosa)—During 1960 production began at the new cement plant of Asia Cement Company and Chia Hsin Cement Company, each with an annual capacity of 150,000 metric tons. Total capacity of the Taiwan cement industry is now more than 1.3 million tons. Ample quantities of raw materials (with the exception of gypsum) are available locally. During 1959 the local cement industry consumed 29,300 tons of gypsum, of which 15,525 tons was imported.

U.A.R.—The privately owned Homs cement plant in the United Arab Republic (Syrian Region), constructed with East German assistance, began operating in April, 1960. Production is reported at 300 to 350 t.p.d.

U.A.R.—Last March, a contract was signed with F. L. Smidth and Company for the construction of a 100,000 t.p.y. cement plant in Hama, United Arab Republic (Syrian Region).

Philippines—The Mindanao Portland Cement Company, Iligan City, Mindanao, Philippines, will soon have a 3,000-bbl.-per-day plant. All equipment, costing $2,500,000, will be supplied by the Fuller Company, which recently shipped an order weighing 4,470,000 lb. overseas.

Italy—During 1960, Italian cement production reached a peak of 15,800,000 tons. This figure is 1,500,000 tons (10.9 percent) over 1959 production. Italy continues to rank second among the Common Market countries in cement production, and fifth among world producers (after the United States, the U.S.S.R., Japan, and Germany).

The industry in Italy consists of 70 companies operating 111 plants throughout the country.

The Expanded Clay and Shale Association will hold its annual meeting January 12-13, 1962, at the Deauville Hotel, Miami Beach, Fla.

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PLUS ECONOMY
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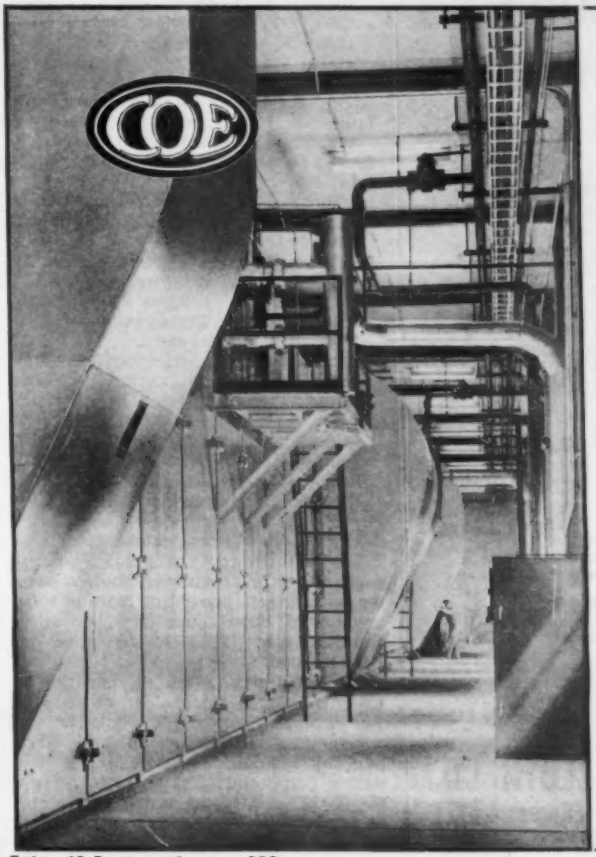

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All HOYT Smoothtop Screens of .3125 wire diameter and larger are *single crimped* rather than wheel or gang crimped. This assures absolute tightness for the life of the screen . . . *wires will not loosen at crimp intersections.* Crimping wires individually also makes it possible for us to space or skip crimps to allow for a flat bearing surface across a center hold-down bar, or provide a flat feathered edge to rest on the side shelf. HOYT custom construction is your assurance of increased efficiency and performance in addition to maximum screen life.

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Custom manufacture and Oil Tempered SUPERTOUGH WIRE are a hard-to-beat combination. Many producers tell us that SUPERTOUGH outlasts spring grade wire screens anywhere from 20% to 200% . . . to say nothing about the added savings which result from less down-time and fewer screen changes. You can have the best screens money can buy . . . for less than you're now paying for cheaper screens. Want the facts? Call or write today.

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STATEMENT OF OWNERSHIP

Statement required by the Act of August 24, 1912, as amended by the acts of March 3, 1933, July 2, 1946, and June 11, 1960 (74 Stat. 208), showing the ownership, management, and circulation of PIT AND QUARRY, published monthly at Chicago, Illinois, for October 1, 1961.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, PIT AND QUARRY PUBLICATIONS, INC., Chicago, Ill.; Editor, W. E. Trauffer, same; Managing Editor, W. E. Trauffer, same; Business Manager, William A. Wilson, same.

2. The owner is: (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

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3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required by the Act of June 11, 1960, to be included in all statements regardless of frequency of issue.) 12,083.

W. A. WILSON
Signature of Business Manager

Sworn to and subscribed before me this 19th day of September, 1961.

JAMES G. KOSTKA
(SEAL)

(My commission expires April 28, 1963.)

New Haven Trap Rock Owls Join National Organization

At the New Haven (Conn.) Trap Rock Company's plant a new chapter of the Wise Owl Club of America was organized recently. Members of this organization are persons who have escaped eye injury or loss of vision because they were wearing safety eye-wear on the job at the time of an accident.

The Wise Owl Club plan, sponsored by the National Society for the Prevention of Blindness, was formed to help reduce the toll of 300,000 industrial eye injuries annually. There are now more than 21,475 members, representing a compensation saving in excess of $105 million.

Edward T. Perry, vice-president of New Haven Trap Rock, is on the sponsoring society's board.

A.S.T.M. Change of Name Effected Through Court Degree

The name of the American Society for Testing Materials was officially changed with the signing of a court decree in September, amending the society's charter originally granted in 1902. The full name of A.S.T.M. is now the *American Society for Testing and Materials.*

Officials explain that the inclusion of the word "and" in the society's name emphasizes the research work done by A.S.T.M. in seeking knowledge on the nature of the materials. A Division of Materials Sciences was established two years ago, giving greater stimulus to the organization's work in that field.

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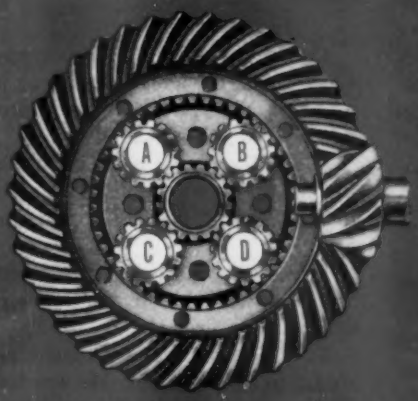
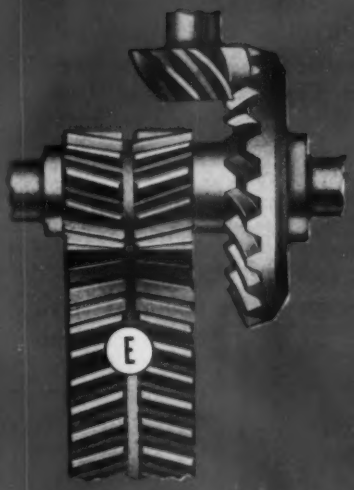
THIS

NEW EATON PLANETARY
DOUBLE REDUCTION

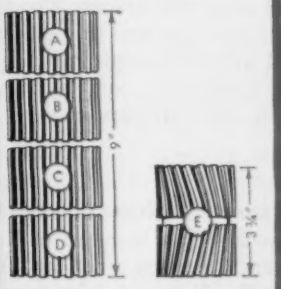


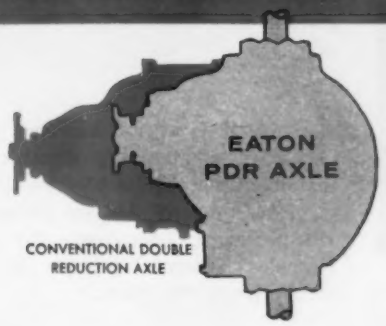
WITH THIS

OLD EATON HERRINGBONE
DOUBLE REDUCTION



2½ TIMES MORE TOOTH CONTACT AREA
(in second reduction)





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Eaton PDR is more rugged. Four planetary gears instead of one herringbone have more total gear tooth contact area to absorb load, transmit power—and give longer axle life.

Eaton PDR is shorter. Planetary gearing instead of herringbone for the second reduction reduces overall length as much as ten inches This means better driveline angles—shorter wheelbase—less weight.

There are many more reasons why Eaton Planetary Double Reduction Axles are best: lower initial cost, readily available parts interchangeability, less expensive service parts when service is required.

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Industry Personalities

WALTER W. PAISLEY has accepted the post of director of sales for Marquette Cement Manufacturing Company (and its subsidiaries), Chicago, Ill., effective November 1. He was formerly general sales manager of Riverside Cement Company.

GEORGE M. MEISEL has joined Kaiser Engineers, Oakland, Calif., as a development engineer, mining and minerals division, and will be responsible for new projects for the company throughout the United States and Canada.

R. E. Haskins

R. E. HASKINS has recently been appointed vice-president of production for British Columbia Cement Company, Ltd., and Evans, Coleman & Evans Limited, Vancouver. Mr. Haskins has been manager of B. C. Cement's Bamberton plant for the last 11 years. In his new post his headquarters will be in Vancouver, B. C.

ROBERT F. CURTIN was named vice-president, sales, for The Mercer Lime and Stone Company, Branchton, Pa., manufacturers of high-calcium lime products. He joined the firm after 20 years as a sales representative for the Warner Company.

WILLARD J. LA MORTE, president of Richmond Screw Anchor Company, Brooklyn, N. Y., has been elected president of Shattuck Denn Mining Corp. He succeeds THOMAS BARDON, who will continue as chairman.

Mr. La Morte has been president of Richmond since 1958. Richmond is a subsidiary of Shattuck Denn.

W. A. Brobston

WILLIAM A. BROBSTON was recently elected vice-president, marketing, of the Atlantic Cement Company, Inc., New York, N.Y. He will have responsibility for all marketing and sales activities for the company, including the establishment of several distribution points along the Atlantic Coast.

Mr. Brobston was formerly associated with the Lehigh Portland Cement Company, most recently as eastern regional sales manager.

CLAUDE E. HARPER, vice-president and general manager of Kaiser Gypsum Company, Inc., and WILLIAM P. JACKSON, vice-president

C. E. Harper

W. P. Jackson

and general manager of Glacier Sand & Gravel Company, have been elected vice-presidents of Permanente Cement Company.

KENNETH J. SAMUELS was elected assistant secretary of Permanente Cement, Permanente Steamship Corp., Glacier Sand & Gravel, and Permanente Trucking Co.

ALFRED D. GRES has been elected assistant treasurer and credit manager of Florida Portland Cement Division, General Portland Cement Company, Tampa, Fla. He succeeds the late OTTO L. PELHAM.

G. S. Neel

GEORGE S. NEEL retired, effective August 31, 1961, as vice-president, central and western sales region, of U. S. Steel's Atlas Cement Division. Mr. Neel joined Universal Atlas in 1919 and served in various sales and sales management capacities until 1952, when he was elected to the vice-presidency.

General Crushed Stone Company, Easton, Pa., elected the following to its board of directors, and also promoted them, as indicated:

F. C. MOORE was named assistant secretary, and will continue to serve in his present post of purchasing agent.

J. E. HUMMER is the new assistant treasurer; he remains comptroller of the firm.

T. C. FOOTE was appointed assistant to the president. He was formerly assistant to the vice-president.

E. E. DOTTER was named operations manager; he was previously general superintendent of the company.

DAVID P. GRIFFITH has been appointed assistant to the director of manufacturing for Alpha Portland Cement Company. He was formerly vice-president, operations, for the Hercules Cement Company at its Stockertown, Pa., plant.

C. W. COSBY, formerly general superintendent of the Riverside Cement Company's mining and manufacturing operations, has been promoted to the position of works manager, effective October 2, 1961. Mr. Cosby's new position was created to combine the duties of general superintendent and director of manufacturing. The latter post was recently relinquished by Charles H. Fontius, who was promoted to the post of controller. Riverside's main offices are in Los Angeles; its plants are located in Oro Grande and Crestmore, Calif.

The following promotions were announced by the Marquette Cement Manufacturing Company:

L. R. FORBRICH assumes the post of director of all the company's producing and distributing operations.

L. R. Forbrich

R. R. Basler

His former position was that of vice-president of the Green Bag Cement Company, a Marquette subsidiary.

RALPH R. BASLER, formerly superintendent at the Cape Girardeau, Mo., plant, was made assistant director of operations on the Marquette headquarters staff.

A. J. COOMBS, superintendent of Marquette's plant at Nashville, has been transferred to Cape Girardeau, Mo., as the plant superintendent, where he succeeds Mr. Basler. The new superintendent at Nashville is J. W. MOODY, formerly production superintendent at Cape Girardeau under Mr. Basler.

MARVE NARRAMORE, managing director, Perlite Institute, Inc., New York, N. Y., was among a select group of 34 of the nation's leading association executives who recently received the Chartered Association Executive (CAE) Award of the American Society of Association Executives.

Mr. Narramore is currently president of the New York Society of Association Executives.

CHARLES M. ANDRES has been appointed manager of trade relations for Permanente Cement Company, Oakland, Calif., and for all Permanente subsidiaries, including Kaiser Gypsum. Mr. Andres has been in the Kaiser organization since 1953.

D. E. Muir

DONALD E. MUIR, formerly vice - president, operations, Arizona Sand & Rock Company, Phoenix, Ariz., has been named general sales manager of the Riverside Cement Company, Los Angeles, a division of American Cement Corporation. He replaces Walter Paisley, who has joined the Marquette Cement Company as sales director.

Mr. Muir served as Riverside's director of public relations from 1951 to 1958. From June, 1958, until July, 1959, he was a sales representative for the Phoenix Cement Company, another American Cement division. Later, he joined Acme Materials Company, Phoenix, as general manager and subsequently became vice-president, then president. Acme later changed its name to Phoenix Concrete Co. Early in 1961, Phoenix Concrete was merged with Arizona Sand & Rock Co.

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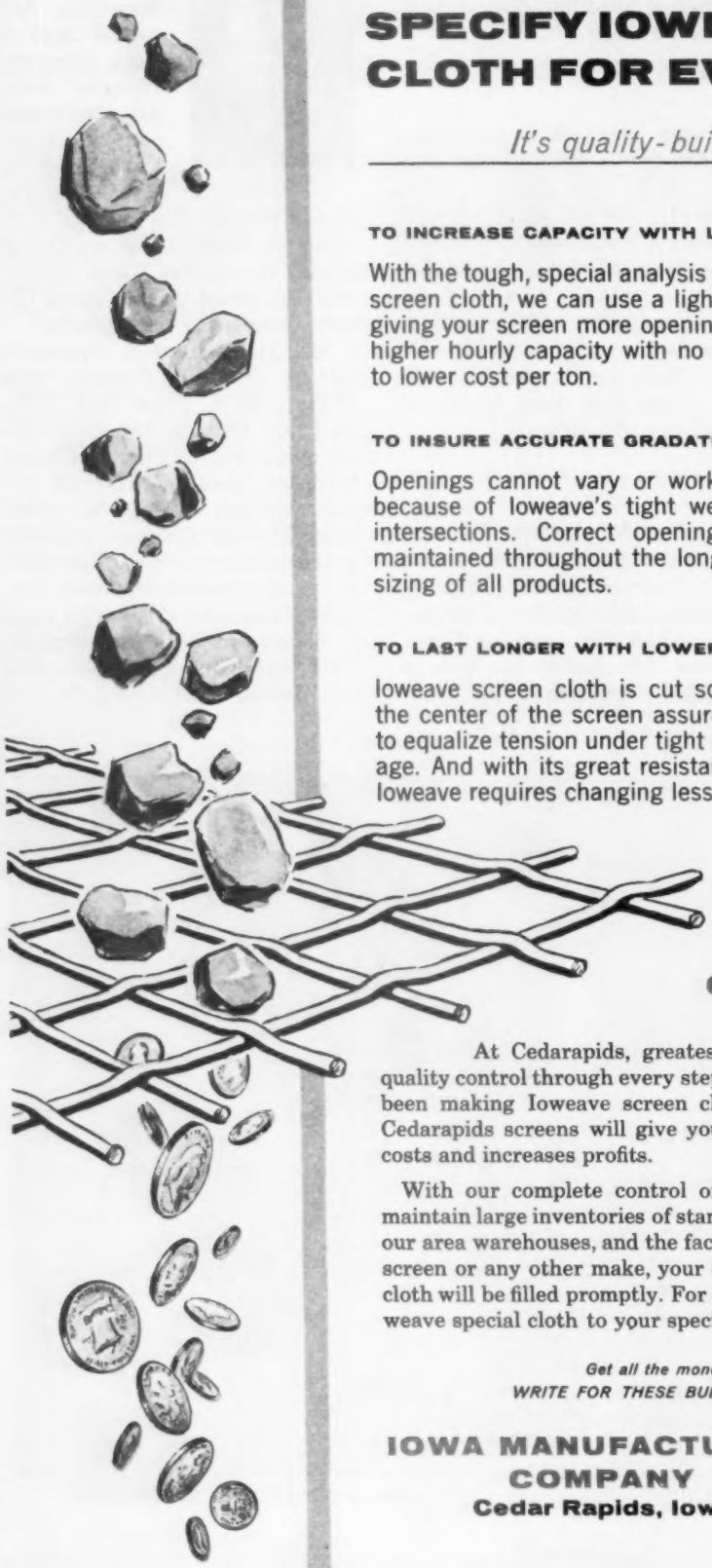
To increase your screening profits

SPECIFY IOWEAVE SCREEN CLOTH FOR EVERY SCREEN

It's quality-built by Cedarapids Built by IOWA



TO INCREASE CAPACITY WITH LOWER COST PER TON

With the tough, special analysis oil tempered wire used in loweave screen cloth, we can use a lighter gauge for specified openings, giving your screen more openings per square foot. The resultant higher hourly capacity with no extra operating expense adds up to lower cost per ton.

TO INSURE ACCURATE GRADATION

Openings cannot vary or work loose under severest vibration because of loweave's tight weaving and positive lock at wire intersections. Correct opening sizes and proper tension are maintained throughout the long life of the cloth, assuring exact sizing of all products.

TO LAST LONGER WITH LOWER MAINTENANCE

loweave screen cloth is cut square. Measurements taken from the center of the screen assure perfect uniformity of the edges to equalize tension under tight stretching and prevent wire breakage. And with its great resistance to abrasive wear and fatigue, loweave requires changing less often than other brands.

WHY CEDARAPIDS MAKES ITS OWN SCREEN CLOTH

At Cedarapids, greatest emphasis is placed upon precise quality control through every step of manufacture. Since 1943 we have been making Ioweave screen cloth in our factory to be *sure* that Cedarapids screens will give you the quality performance that cuts costs and increases profits.

With our complete control of screen cloth manufacture we can maintain large inventories of standard sizes at Dealer establishments, our area warehouses, and the factory. Whether you own a Cedarapids screen or any other make, your order for top quality Ioweave screen cloth will be filled promptly. For special requirements, we can quickly weave special cloth to your specifications.

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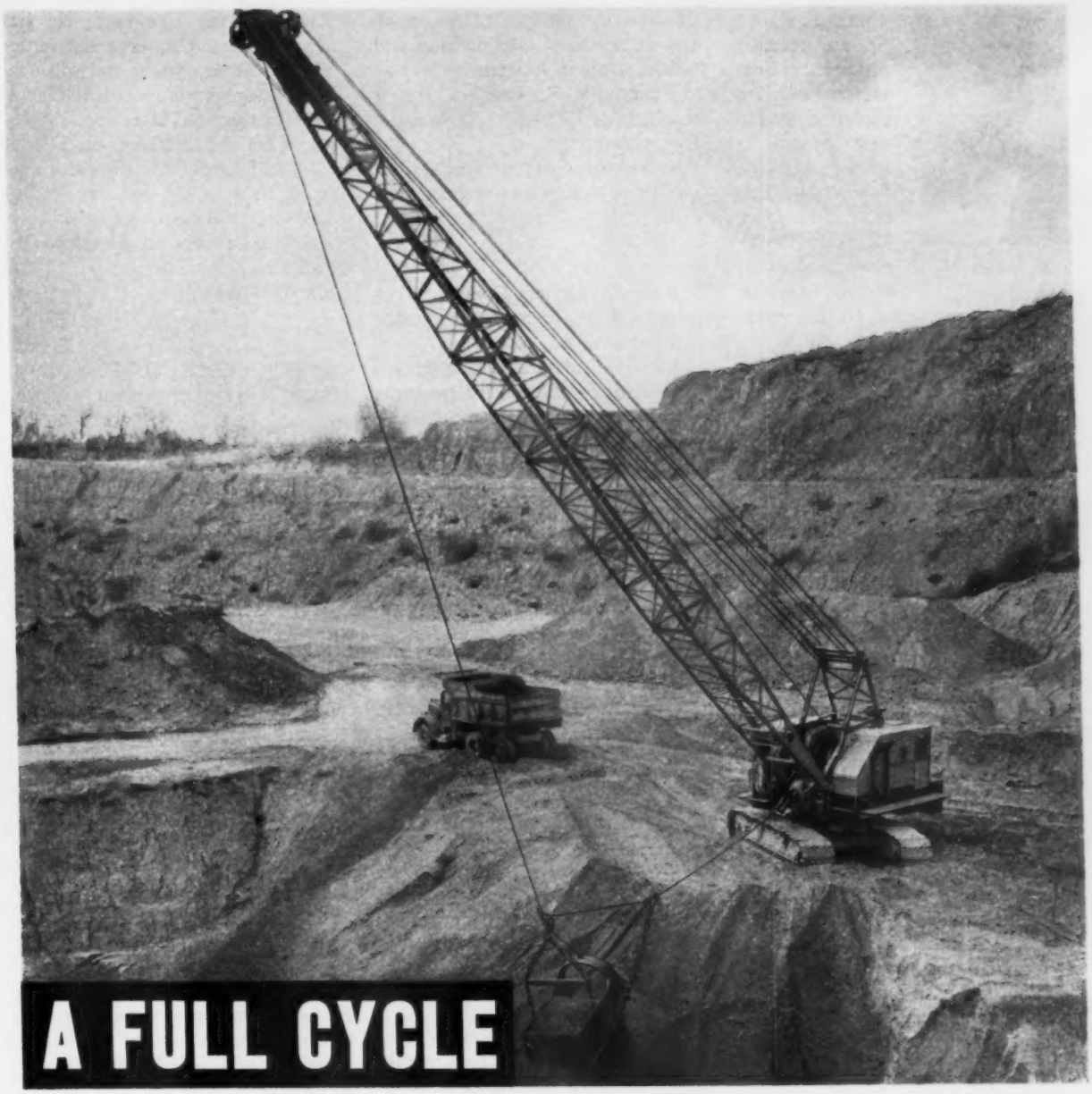

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FASTER, MORE OFTEN WITH AN 805

The ability to dig in and get out *fast*, with a profitable payload on every cycle, has made the 805 a favorite in gravel pits everywhere. It's quick to respond under all digging conditions. With 2 or 3 yard bucket, 50 to 150 feet of boom you get the capacity and range needed to move more tons per shift.

A power assist on big main drum clutches provides finger-tip control, yet gives the operator positive feel of the load. Engaging speed is automatically controlled to cushion shock and impact loading, protect cable.

Revolving fairlead turns 360° — maintains true cable lead at every pull angle on bucket. Only two sheaves — large diameter — prevents sharp reverse cable bending, provides longer cable life.

See your distributor or write for bulletin!

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E. F. Rader Sr.

EDGAR F. RADER SR. was recently promoted from the post of plant superintendent to that of works manager of the Stockertown, Pa., plant of Hercules Cement Company, a division of the American Cement Corporation. He has been with the company since 1918.

Four promotions of supervisory personnel at Dundee Cement Company were announced recently:

IB JENSEN is now plant superintendent; DOUGLAS C. SHANKS has been named superintendent of service; WILLIAM R. DERSNAH has been advanced to the position of technical superintendent; and TERRY PATZIAS is the new chief chemist.

The Gibsonburg Lime Products Company, Gibsonburg, Ohio, has recently elected two vice-presidents:

JAMES E. GARN, vice-president of sales, in charge of all sales of products which the company manufactures and distributes (dolomite lime and stone products).

VIRGIL S. TADSEN, vice-president of research and development, in charge of technical phases of operations including research and development on new products and plant processes.

WARREN F. SMITH has retired as vice-president and manager of operations for the Lone Star Cement Corporation in New Orleans, La. He began his work in that city in 1946 as division sales manager. In 1952 he was made vice-president and manager, succeeding H. A. SAWYER, who became president at that time and is now chairman of the board.

National Gypsum Company, Buffalo, N. Y., recently announced the following promotions:

CHARLES A. STENGLE to the post of division manager of the newly created northeast sales division, with headquarters in Boston.

FREDERICK R. GRIFFIN JR., to succeed Mr. Stengle as Boston district manager.

ALFRED J. GOLO, to succeed Mr. Griffin as New Haven district manager.

Riverside Cement Company, Los Angeles, Calif., recently announced two promotions:

JOHN H. ASMANN has been advanced to the position of treasurer from his former post of controller.

CHARLES H. FONTIUS has been promoted to the post of controller. He was formerly director of manufacturing for the company.

CHARLES R. HEILIG has recently been appointed manager of furnace products sales for Basic Incorporated, Cleveland, Ohio. He has been with Basic since 1944.

C. R. Heilig

T. D. Hess

THOMAS D. HESS, formerly assistant sales manager of the central district, succeeds Mr. Heilig as central district sales manager. He will supervise refractory sales in Cleveland, Detroit, Buffalo, the Ohio River valley, and Eastern Canada.

JOHN V. BEALL is the new editorial director of the Society of Mining Engineers of the American Institute of Mining, Metallurgical and Petroleum Engineers. The society publishes the monthly magazine *Mining Engineering*, the official *Transactions*, and related works.

THOMAS C. GEARY has been appointed sales representative by Calaveras Cement Co., a Division of The Flintkote Company. He has worked as a Calaveras laboratory chemist for ten years, and will now be its representative for architectural, plastic, and other specialty cements for the California sales territory, with headquarters in San Francisco.

WARREN BRYANT has also been appointed a sales representative by Calaveras. He will cover the Chico-Marysville area.

O. F. Grieve

O. F. GRIEVE, general manager of manufacturing, Bestwall Gypsum Company, was recently elected vice-president. He has been in charge of manufacturing operations for some ten gypsum mines and plants throughout the United States. His headquarters are at the company's research facilities in Paoli, Pa,

NORMAN C. LUDWIG, manager of manufacturing research, Universal Atlas Cement Division, U. S. Steel, was recently selected by the American Petroleum Institute to receive its 1961 "Citation for Service" award for outstanding service to the petroleum industry. He was cited for his leadership as a member and officer of the Committee on Standardization of Oil-Well Cements and as national secretary.

FRED W. ELLIOTT was recently elected executive vice-president of Michigan Chemical Corporation, St. Louis, Mich.

Mr. Elliott was formerly group vice-president of H. K. Porter Co., Inc.

DAVID H. COMMAN has been appointed Iowa district engineer for the Portland Cement Association, to succeed the late FRED F. LOY. Mr. Comman will be responsible for P.C.A.'s engineering and educational activities in Iowa.

Enter 57 on card, page 181 →

PRODUCTION – *NEW STRENGTH FOR SOUTH KOREA*

Private enterprise is turning South Korea into an industrialized, highly productive country, to the benefit of all her people.

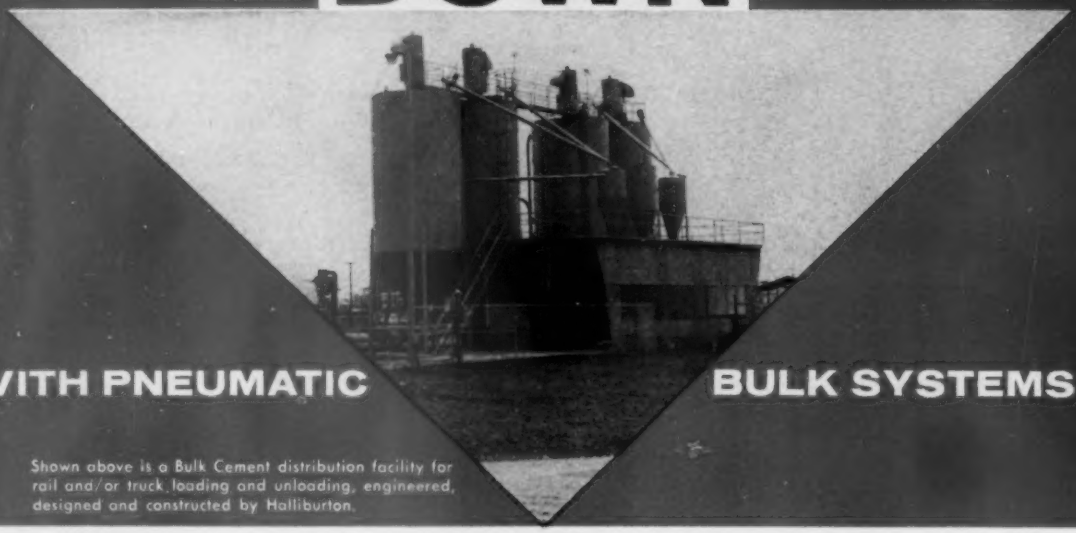
This is exemplified by the Mungyong plant of Korea Cement Manufacturing Company, Ltd., which operates two F.L. Smidth rotary kilns, each 3.15 • 2.85 • 3.15 metres dia. x 123 metres long.

"MAGNECON" kiln liners, uniquely the product of Canadian Kilmar magnesite, are used in the hot zones of these kilns. The "MAGNECON" liners contribute substantially to economy of operation by giving roughly five times the service life of previously-used refractories. A recent report from Korea Cement, covering 335 days of service, concludes "The quality of 'MAGNECON' is superior and satisfactory."

CANADIAN REFRACTORIES LIMITED
CANADA CEMENT BUILDING, MONTREAL, CANADA

Write for technical folder "'MAGNECON', the hot zone refractory to keep your kiln on the line".

HANDLING COSTS GO DOWN



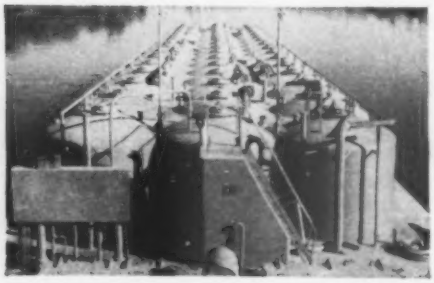
WITH PNEUMATIC BULK SYSTEMS

Shown above is a Bulk Cement distribution facility for rail and/or truck loading and unloading, engineered, designed and constructed by Halliburton.

Halliburton Pneumatic Trailer with two 350 cu. ft. tanks.

Air Troughs, open or closed type, with pneumatic control gates operated from remote locations.

Halliburton engineered pneumatic "Floating Warehouse" bulk material barge facility — 8,750 bbl. bulk cement load capacity.



If it's dry . . . if it's bulk
if it's here and you want it there . . . Halliburton Pneumatic Bulk Handling Systems can move it faster and cleaner than any mechanical conveyor.

Halliburton Pneumatic Systems operate on the proven simplicity of low air pressure. With them, you can convey most any powdered — and many granular materials *anywhere you can run a pipe.*

In addition to in-plant handling systems, Halliburton can provide Pneumatic equipment for bulk materials handling by any conveyance — road, rail, or marine.

Call for a visit from a Halliburton man. He can help you lower the cost of handling dry bulk materials *. . . pneumatically!*

Over 35 years experience
of handling more than
500,000,000 cu. ft. of materials

SPECIAL PRODUCTS DIVISION

Halliburton
COMPANY . DUNCAN, OKLAHOMA

CLIFTON F. ARICK, formerly Cleveland district sales manager of the Huron Portland Cement Company, was recently named general sales manager of the Breckling Concrete Corporation, Cleveland, Ohio.

OMAR J. GLANTZ was appointed director of technical services of Penn-Dixie Cement Corporation, effective September 1, 1961. His headquarters will be in the New York office.

Before his new appointment Mr. Glantz served Penn-Dixie (since 1953) as plant engineer at its Georgia plant, as plant superintendent at Petosky, Mich., and as director of research at the central laboratory at Nazareth, Pa.

EUGENE F. STRATFORD has joined Alpha Portland Cement Co., Easton, Pa., as New York district sales manager. Formerly, Mr. Stratford had been affiliated with the Barrett Division of Allied Chemicals Corp.

WILLIAM E. ELLIS has been appointed manager of the Birmingham plant of Alpha. In his new capacity, Mr. Ellis will direct all operations at the Birmingham plant, where he has served as plant engineer since 1956.

A. J. PERANTONI has been appointed advertising and promotion manager of the intermediates, explosives and mining chemicals, and the refinery chemicals departments of American Cyanamid Company. Mr. Perantoni, with Cyanamid since 1952, will be located in the general sales offices of the division at Bound Brook, N. J.

DR. RUSSELL P. HEUR, vice-president of the General Refractories Company, Philadelphia, Pa., will receive the Francis J. Clamer Medal of The Franklin Institute on October 18, 1961, at the institute's annual Medal Day ceremonies.

The Clamer Medal, founded in 1943, is awarded, at least once in three years by the institute, for meritorious invention, discovery, or research achievement in the field of metallurgy.

This picture of a carload of Columbia shovel pads has special meaning for Columbia customers. A whole car of shovel pads represents quantity, volume. A car poised to roll to the customer is symbolic of action, speed, service. This photo is evidence that Columbia serves the biggest, as well as the smallest user of shovel pads.

Columbia service includes design modifications to meet specific operating conditions. And, of course, Columbia prices must be competitive to satisfy prudent buyers.

Whether you need shovel pads by the carload, or just a set at a time, if you want service, as well as quality, call your Columbia representative.

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DENVER 15, COLORADO

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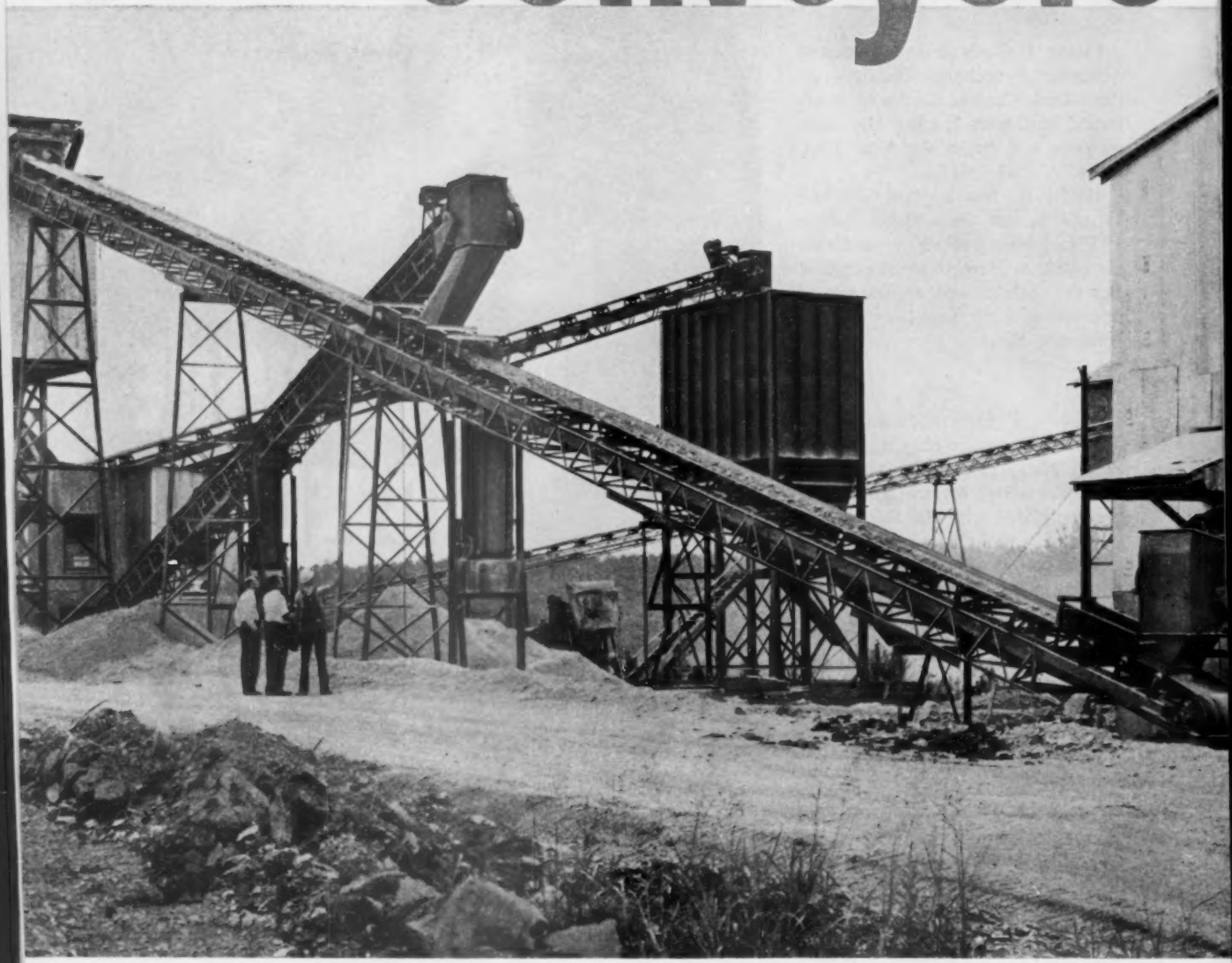
LINK-BELT conveyors



PRE-BILT BELT CONVEYORS—A combination of pre-engineered and pre-selected standard components and structures, Link-Belt Pre-Bilt belt conveyors are designed to meet the requirements for a wide range of applications and operating conditions. Shop assembled components simplify field assembly, minimize erection time . . . resulting in low initial costs. *Job-Engineered* belt conveyors can be designed for small or large tonnage applications, for routes of any length.

The last word in value from the first name in conveyors

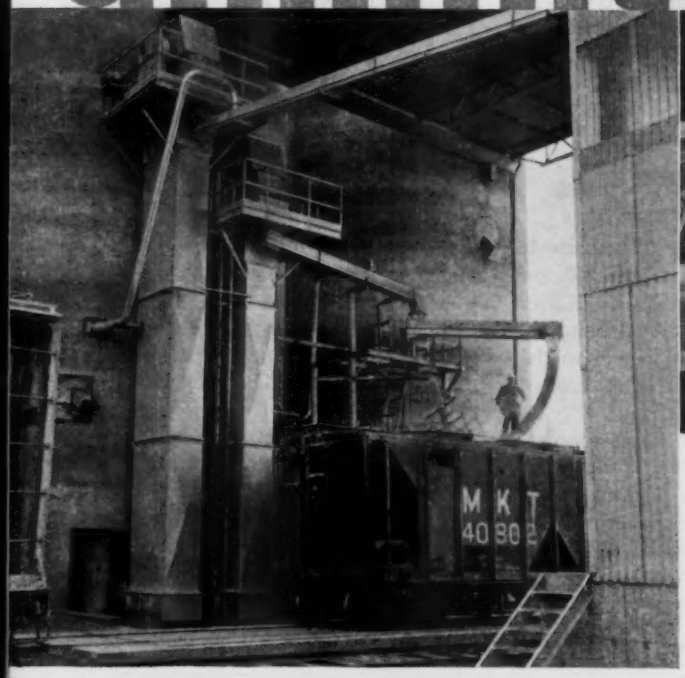
When it comes to your materials handling needs, it is a matter of sound economics to depend on Link-Belt, builders of industry's most complete conveyor line. In addition to this broad range of line, which permits unbiased recommendations, Link-Belt offers *quality*—achieved through engineering skills, manufacturing scope and research . . . *"experience unlimited"* in the materials handling field.

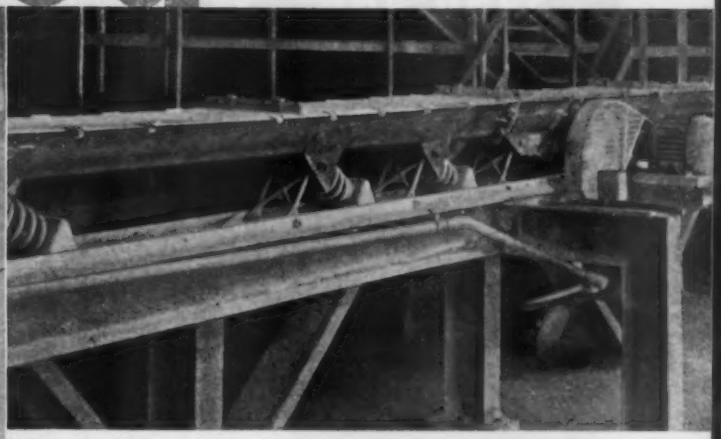
Also important, Link-Belt can provide *complete* handling systems . . . patterned exactly to your requirements with a background of more than 80 years of conveyor specialization. Our engineers are familiar with the particular handling needs of every industry. It's more than likely they have met—and solved—many problems similar to yours. We will design, equip and erect your entire installation . . . and accept full responsibility for its successful operation.

For full information—on single components or complete systems—large or small—contact your nearest Link-Belt office. Catalogs covering all conveyors are available on request.

unlimited

The line that means savings, whether handling raw materials or finished products





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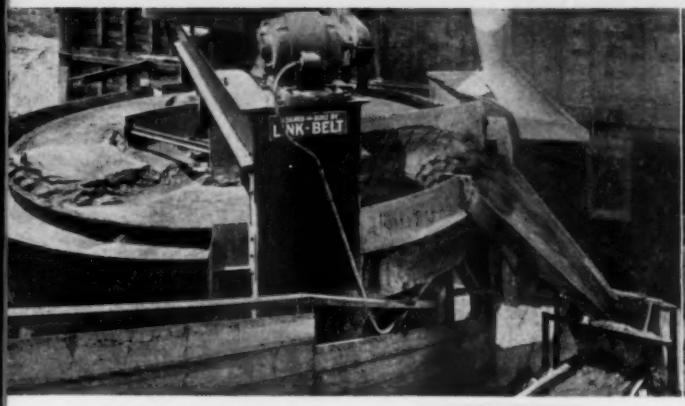
▲ **OSCILLATING CONVEYORS** — Whether handling fines, granules or chunks, Link-Belt's four types of oscillating conveyors — Flexmount, Coilmount, Heavy-Duty Coilmount or Torqmount—provide surge-free movement of hot, wet or dry materials. All feature *full-time positive action*, yet operate as near to *natural frequency* as possible to minimize power requirements.



WASHING, DEWATERING AND CLASSIFYING EQUIPMENT—Link-Belt's sand, gravel and stone preparation equipment assures production of a high grade product . . . is flexible in operation to meet changing specification demands. Here, a Link-Belt Rotoscoop dewaters sand . . . produces a product dry enough to permit transportation by trucks or belt conveyors.

CHAIN CONVEYORS—Drag bulk materials along a trough or can carry the load directly on the chain. In Link-Belt's broad line of chains, there's a type and size to meet every conveying need . . . for light or heavy-duty service. All are built for long-life, low cost operation.

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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses and District Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World. 15.637

Keeping production on the move in every industry

Apron conveyors
Arm and tray elevators
Belt conveyors
Bucket elevators
Bucket elevators-conveyors
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Chain conveyors
Circular carrier conveyors
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Flight conveyors
Flite-Flo conveyors
Jetslingers
Oscillating conveyors
Power-and-free conveyors
Pusher chain conveyors
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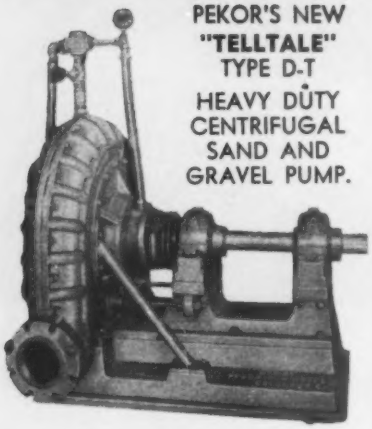
LOOKING FOR A BETTER SAND AND GRAVEL PUMP?



PEKOR'S NEW "TELLTALE" TYPE D-T HEAVY DUTY CENTRIFUGAL SAND AND GRAVEL PUMP.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6x8" suction and 8x10" suction. Now available also in either alloy, 45x90° extra-heavy long-radius flanged elbows.

Have a Look at the TYPE D-T HEAVY DUTY "TELLTALE" PUMP

Wherever it has been put to work its production is the talk of materials people. Likewise, what it can take under what would be heavy overloading for an ordinary pump.

-LOW IN DOWNTIME
-HIGH IN PRODUCTION

"TELLTALE" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pumps to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

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Enter 62-A on card, page 181

D. C. COULSON has retired from Alpha Portland Cement Company, but plans to remain active as a general consultant in the cement and lime processing industries.

Mr. Coulson was associated with Ideal Cement Company from 1930 to 1940. He was chief engineer for the Standard Lime and Stone Company until he joined Alpha in 1947. His last position at Alpha was as chief engineer and assistant to the vice-president.

GEORGE C. DAVIS JR., formerly director of technical services, Kaiser Refractories, a division of Kaiser Aluminum & Chemical Corporation, Oakland, Calif., was named to the newly created position of director of technical planning.

RUSSELL E. PARDEE was appointed manager of technical services, under the supervision of Mr. Davis. He will provide engineering and installation assistance to refractory customers, and will test and evaluate new or improved refractory products.

DAVID J. CRAWFORD was named assistant to the vice-president, operations, of The Callanan Road Improvement Company, South Bethlehem, N. Y. For the last five years he has been mine superintendent for the International Talc Company, Inc., at Gouverneur, N. Y.

LAMBERT D. LAUDER was appointed assistant to the treasurer.

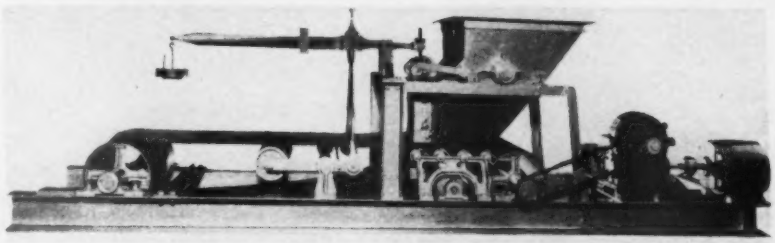
JOHN H. CALLANAN is the new assistant superintendent at the Kingston, N. Y., quarry of The Callanan Company.

ALFRED STAUB has been promoted to the position of chief electrician of the Dundee Cement Company. He has been affiliated with the firm since construction began on the big plant near Dundee, Mich., in 1958.

ROBERT G. FLEMING has been named a sales representative.

WILLARD B. SPRING has been named district manager in the Detroit, Mich., area for the Penn-Dixie Cement Corporation. He succeeds H. H. LUCAS, who has retired.

ECONOMY — HIGH-OUT-PUT



ACCURACY - PERFORMANCE

OVER 1600 POIDOMETER SCALES SERVING INDUSTRY

Schaffer Poidometers are designed and built to assure you the highest output with accuracy and dependability. Production line snags and other costly errors are completely eliminated.

WRITE FOR COMPLETE DETAILS AND CATALOG NO. 5

The Schaffer Poidometer is easy to operate—all you do is set the control devices and it will weigh — feed — mix — blend — record and proportion with the highest degree of accuracy—you will be amazed.

•

Schaffer Poidometers are available with remote control devices for showing and changing feed rate and total weight recorders.

SCHAFFER POIDOMETER CO.
2828 SMALLMAN ST. **PITTSBURGH 22, PA.**

Enter 62-B on card, page 181

Study on Trace Elements Authored by U.S.D.A. Chemists

Trace Elements in Agricultural Limestones of the United States, a comprehensive study authored by P. Chichilo and Colin W. Whittaker, research chemists in the U. S. Department of Agriculture, has been published in the *Agronomy Journal.*

In 220 samples from 35 states, 17 elements were determined. Trace elements varied widely and were found highest in the samples from the west north-central states. Contamination from overburden and milling equipment causes agstone to be higher in trace elements than in unquarried rock. Contents of several elements were found to be proportional to silicon content or total impurities.

At normal liming rates many limestones contribute significant amounts of certain trace elements, and a few limestones contain amounts sufficient for correction of deficiencies.

State Right-to-Work Laws Threatened by New Move

Employers should be vitally concerned about a potential movement in Congress to abolish the power of the individual states to enact "right-to-work" laws which outlaw compulsory unionism.

The Chamber of Commerce of the United States, in order to combat this threat, has created a new Committee for Voluntary Unionism, which will help defend the section of the Taft-Hartley Law which affirms state authority to enact right-to-work laws, and to aid those who want such laws in their states.

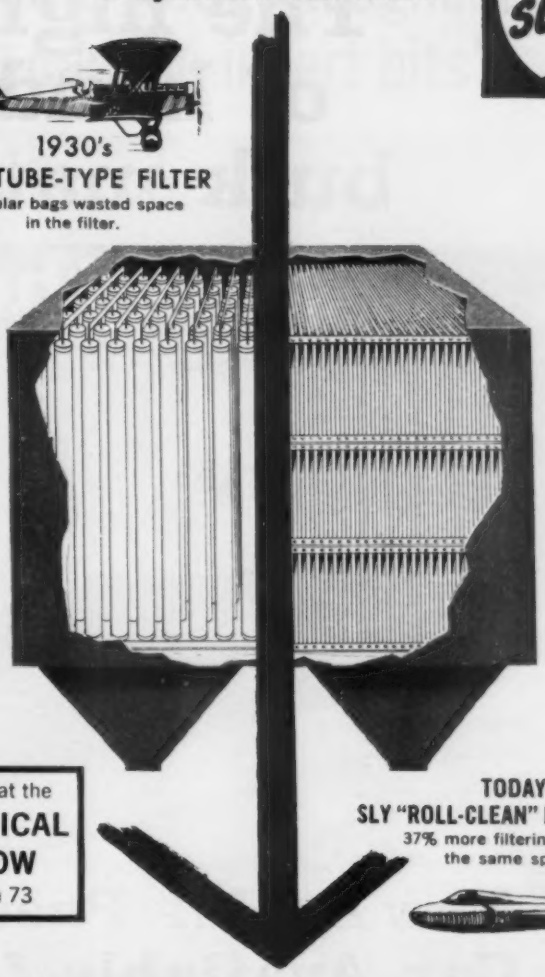
Producers may contact the Chamber's Labor Relations and Legal Department, 1615 H St., N. W., Washington, D. C., for copies of *The Why of a Right-to-Work Law.*

Lime in Masonry Mortar, an article appearing recently in *Masonry,* publication of the Mason Contractors Association of America, covers the role of lime in mortar. This discussion was originally presented at the spring meeting of the Arizona Masonry Guild in Phoenix, by Jack Bishell, United States Lime Products, Division of The Flintkote Co.

Check the Advantages of Dynaclone® Dust Filters

SINCE 1874 SLY

1930's
SLY TUBE-TYPE FILTER
Tubular bags wasted space in the filter.



See Us at the CHEMICAL SHOW Booth 73

TODAY
SLY "ROLL-CLEAN" DYNACLONE:
37% more filtering area in the same space.

COMPACT DESIGN MEANS 20-40% MORE FILTERING CAPACITY

Modern flat bag design is one reason why Sly outperforms other dust collectors. It provides 20 to 40% more cloth in a given space — greater filtering capacity per cubic foot of filter. The Dynaclone and other Sly Dust Filters fit in where others can't. Yet bags are more easily accessible.

The "Roll-Clean" Dynaclone also operates continuously, provides *constant* suction at dust sources for complete dust suppression.

It is automatically self-cleaning. The roller cleaner seals off bags one row at a time for cleaning by reverse air. A single exhaust fan provides suction for dust collection *and* air for cleaning. There are no auxiliary blowers.

And "Resist-O-Wear" bags give 2 to 3 times longer life on the most demanding applications.

Check *all* the Dynaclone advantages . . . *Send for 36-Page Catalog 104.*

"Roll-Clean" Dynaclone: Patents 2,867,289, 2,938,598. "Resist-O-Wear" Filter Bags: Patent 2,959,247.

THE W. W. SLY MANUFACTURING CO.

4745 Train Avenue • Cleveland 1, Ohio • Offices in Principal Cities • Overseas Licensees: Andrew Air Conditioning Ltd., London S. W. 1, England • Mideco Pty. Ltd., Nunawading, Victoria, Australia

Enter 63 on card, page 181

The high cost of handling bulk materials

gets the air

New AIRJET* Pneumatic Tank Car Available for Leasing

The new AirJet* tank car, available through Transport Leasing Company, offers two important dollars-and-cents advantages to bulk shippers.

First, the AirJet* car—a joint project of Pullman-Standard and The Halliburton Company—offers important economies in the movement of bulk cement and other bulk materials. The AirJet*, for example, removes the need for screw conveyors, bucket elevators, suction systems and other costly-to-maintain equipment. The positive pressure unloading requires only a hose connection and compressed air. Transfer of lading between the car and storage containers or highway vehicles is fast and direct. Important, too—the car is self-cleaning, friction-free and can be coated to handle foodstuffs and chemicals, either dry or liquid.

Second, the AirJet* is available on a full-service leasing basis providing freedom from investment and maintenance responsibility while providing other important benefits to the user.

If you are—or should be—a bulk shipper, find out how many advantages you will gain by using AirJet* Pneumatic Tank Cars to move your product. Contact us today for full information.

*A Trademark of Pullman Incorporated

TRANSPORT LEASING COMPANY
A SUBSIDIARY OF **PULLMAN INCORPORATED**
200 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS
Representation at Pullman-Standard Offices in Birmingham, Pittsburgh, New York, and J. C. Fennelly Co., San Francisco.

"We drilled some of the West's toughest rock with Timken® carbide insert bits"

Special report from
Morrison-Knudsen Co. Inc.

**LOCATION:
RAILROAD RELOCATION,
WILLIAMS TO CROOKTON,
ARIZONA**

Operating conditions:
Malpais

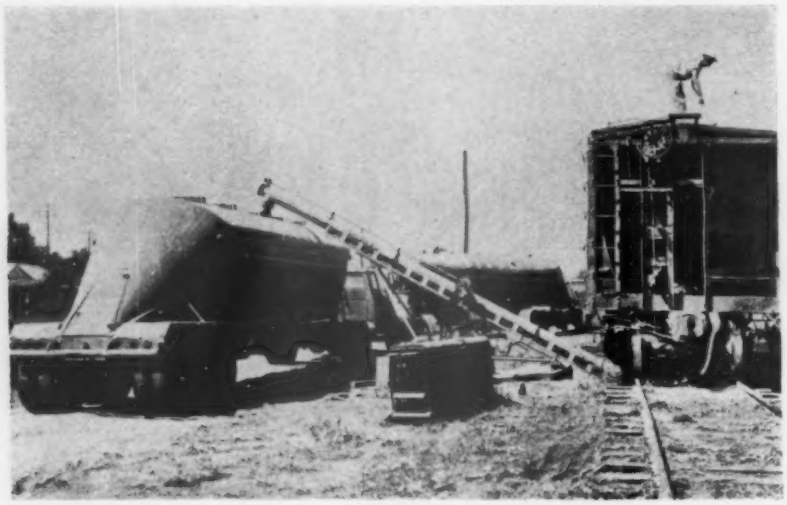
Carving out a railroad roadbed through tough malpais called for consistently high quality rock bits. Morrison-Knudsen selected Timken® removable carbide insert bits for the job and drilled over 3,000,000 ft. of hole in this volcanic formation — some of the toughest rock in the West. The carbide insert bit's 5-front hole design, pioneered by the Timken Company, assured excellent hole cleaning. And the special analysis carbide inserts took all the punishment of drilling in this basalt lava formation.

Which Timken Bit should you use?

For drilling hard, abrasive ground the Timken carbide insert bit gives you greatest economy. In softer ground, the low-cost Timken all steel multi-use bits having a shoulder drive can be used to best advantage. When harder and more abrasive rock is encountered, simply switch to Timken carbide insert bits. They fit the same drill steel. Let our rock bit experts help you select the right Timken bit for your job. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

TIMKEN®
removable rock bits

new machinery



● The Andrews Machine Company offers a portable conveyor designed to cut unloading costs of cement, hydrated lime, pulverized limestone, gypsum, and other bulk materials.

A construction company in Oklahoma charged with the task of building missile sites in Oklahoma and Texas and unloading cement and other bulk materials at each site, has used the following portable set-up and reports substantial savings in cost.

Using one portable set-up to serve several sites, the main unit in each unloading operation is an Andrews P-52 gasoline-powered portable conveyor. Each conveyor is 30 ft. long with a 9-in. screw and delivers about 720 bbl. of cement per hour. It attaches easily beneath the hopper of the car and discharges directly into the top of the truck.

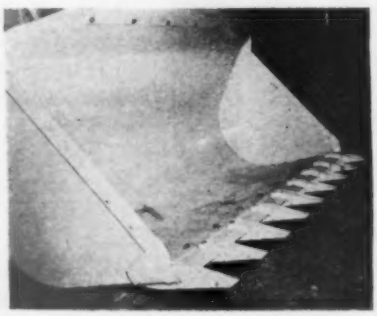
A portable generator at each site furnishes electricity for a Vibra-Plus vibrator which attaches to the hopper of the car to keep material flowing at top capacity.

The problem of converting single-phase current from the generator to the three-phase current required by the vibrator was solved by the use of an Add-A-Phase 2S phase converter manufactured by the System Analyzer Company. **(350)**

● New, longer tips are now available for the bucket teeth of the three Caterpillar track-type loaders and the two larger Cat wheel-type loaders, according to a Caterpillar Tractor Company announcement.

With added steel in the wear zone, the new tips last up to twice as long in abrasive material as the previously-available shorter tips. The company reports the shorter ones may still be had and are recommended for use in high impact applications.

The new tips are of two designs —"runner" and "digger". The runner type is for use with wheel loaders, where maximum wear is normally on the bottom of the tooth. The digger type is for use on track-type machines where maximum wear is usually on the top side of the tooth. **(351)**



● A shredded wire undertread has been developed by Goodyear Tire & Rubber Company that will help big off-the-road tires withstand the punishment of such operations as quarrying and mining.

Lying between the fabric body of the tire and the outer tread, the rubber undertread contains millions of tiny pieces of built-in wire.

According to John H. Hartz, tire development manager, the new undertread greatly increases tire life and reduces replacement and maintenance expense for heavy equipment operators. He says, "It results in exceptional cut-resistance by providing a barrier of high tensile steel, limits growth of any cuts that do occur, and gives better adhesion between tread and tire body."

The development reportedly results in a higher percentage of recappable tire bodies, and fewer plugs are said to be necessary in preparing the tire body for retreading.

The wire is .0058 in. in diameter. A 33.5-33 tire contains more than 6 million pieces of wire and weighs approximately 19 lb.

When the wire is mixed in the rubber, tremendous force is exerted to assure lasting dispersion of the wire. The wire-reinforced rubber is then formed into thin sheets which are laminated to form the undertread section of the tire.

The shredded wire undertread is standard in sizes 14.00 and larger of the Hard Rock Lug, Hard Rock Lug Xtra-Tread, Hard Rock Rib, Sure-Grip, and Sure-Grip Lug tires. It is also available on a premium basis in the 8.25 to 11.00 size range of the Super Road Lug tire. **(352)**

and equipment

for further information use card on page 181

● A self-contained portable pneumatic sump pump for the removal of sludge, sewage, water, etc. from sumps, quarries, and mines is available from Schramm, Inc.

The pump body, impeller, and strainer are made of bronze, to resist corrosion and ensure spark-free operation. Heavy thrust and radial bearings support the two-part, nonclogging impeller, mounted on a stainless steel shaft. Bearings are double sealed. As it requires no priming the pump is ready for instant use. It is 19⅜ in. high, and can be passed through a hole as small as 10 by 12 in. Any liquid over 1⅜ in. deep can be picked up. Solids over ¾ in. are blocked out by the integral bronze strainer.

Pump speeds vary between 3,200 and 3,600 r.p.m., depending upon the head against which it is pumping and the supplied air pressure. Excessive speed is prevented by a built-in governor. **(353)**

● "Plastic Pack", an epoxy resin compound for use in filling cavities between manganese wearing surfaces and structural steel members of crushers, is now available from Allis-Chalmers.

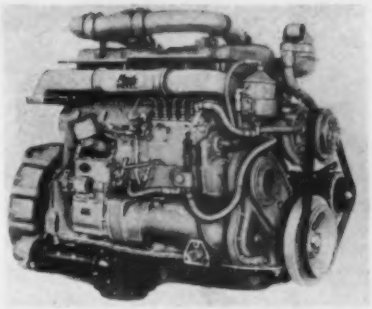
The resilient, non-shrinking compound does away with the need for elaborate application preparations. Easy to pour, it can be applied at the crusher site. It has a maximum compressive strength of 16,000 p.s.i.

Plastic is poured as a filler into the space between the head and mantle or top shell and concave ring. **(354)**

● Mack Trucks, Inc., has announced development of the PowerRam Thermodyne diesel, a more powerful version of its naturally-aspirated Thermodyne diesel engine with virtually no increase in engine weight.

The manufacturer reports the horsepower increase was made possible through use of a new air intake principle which increases volumetric efficiency by 10 percent.

Torque output is improved. Maximum torque is 505 lbs./ft. at 1400 r.p.m. According to the manufacturer weight of the END-673P remains 400 to 500 lbs. lower than other comparable engines. **(355)**



● Exclusive rights for production and sale of a unique "Uni-twin" portable crushing plant have been granted Lippmann Engineering Works, Inc., by Johnson Welding and Equipment Co., a Lippmann distributor.

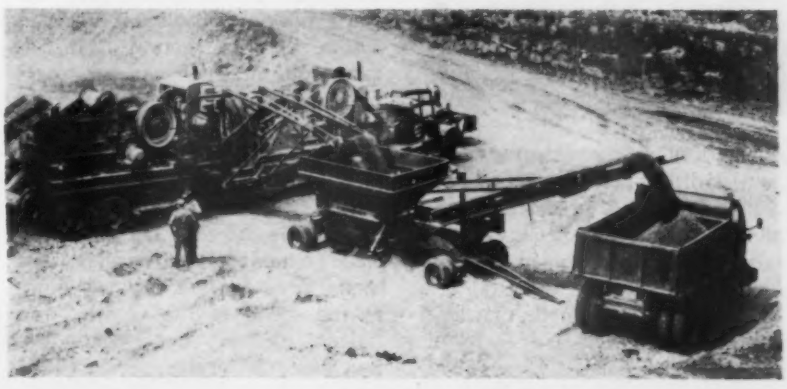
The 39-ft. long, 12-ft. high, 8-ft. wide plant has been granted 7 patent claims with 15 more claims yet to be decided. Developed with the cooperation of Lippmann engineers, it is reported that the Uni-twin portable offers twice the screening area of comparable size crushing plants.

Material is moved from the feed end to discharge point continuously over screen sections. The crushers also discharge directly on screens. As a result all finished material, including "fines", are discharged without rehandling.

The Uni-twin portable is available in a wide variety of combinations—with twin jaw crushers, jaw and roll crushers, twin roll or gyratory crushers.

The first unit, now in operation in Wisconsin utilizes one 12-in. by 36-in. Lippmann Grizzly King jaw crusher, one 42-in. by 24-in. Lippmann roll crusher, one 3-ft. by 8 ft. two-deck scalping screen, and two 4-ft. by 10-ft. double-deck vibrating screens, a rotary lift, and 36-in. by 15-ft. discharge conveyor and one 30-in. by 11-ft. return conveyor. Both jaw and roll crusher are independently powered.

Output figures are given as 372 t.p.h. of ¾-in. minus. The company also claims that maintenance time-costs are greatly reduced as all major components can be reached without dismantling feed or conveying equipment. **(356)**



● An improved series "B" version of the H-30 4-wheel drive "Payloader" tractor-shovel has been announced by The Frank G. Hough Co.

The unit, smallest in Hough's 4-wheel drive line, is now equipped

with a 1¼-cu. yd. bucket, adding 25 percent more capacity. The balance and stability of the original H-30 has been retained.

Boom arms are positioned ahead of, and away from, the operator. The H-30B has a walk-in operator compartment, hand rails and safety ladder, adjustable bucket seat, and new transmission controls. The cowl is steeply sloped.

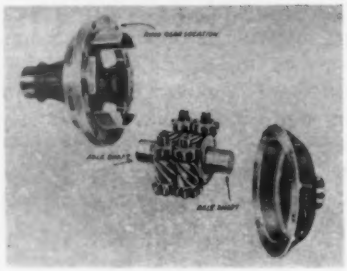
Four-wheel hydraulic brakes are sealed and give equal braking in both forward and reverse. The axle has been designed to allow servicing or relining of the brakes without removing the planetary hubs.

The simplified boom mechanism and single bucket tilt cylinder reportedly result in from 6 to 12 fewer pivot and grease points than other loaders. All bucket and lower boom points are sealed.

Dual foot brake pedals give the operator a choice of braking with or without engaging the transmission. Both axles are equipped with torque-proportioning differentials. When one wheel is capable of receiving more tractive effort than the other on the same axle it can automatically receive 38 percent more torque. **(357)**

● A differential designed by Dual Drive, Inc., provides more efficient use of engine power for vehicles. It can be especially designed to accomplish any tractive balance between wheels from 50-50 to 100-0 without affecting the 50-50 power division on turns or irregular terrain.

The differential consists of two basic operating parts, a balancing gear and a side gear. The entire unit is quickly interchangeable with a standard gear carrier. In operation the worms on the axle shaft mesh with the worm wheels to assure positive drive under all conditions. The worm wheels are inter-

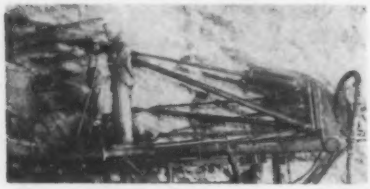


connected by balancing gears for exact power division on turns. A system of gears, acting as driving keys, transmit engine power to the rear wheels in exact ratio to the traction resistance of the wheels when the vehicle is in either forward or reverse motion.

Benefits resulting from use of the Dual Drive full time differential include elimination of swerve, tire scuffs when the wheel slows down to the speed of the vehicle, axle fatigue, sidesway, swerve, and power loss. **(358)**

● The "Long Tom" 9-ft. retractable air leg drill, made by Machinery Center, Inc., is said to be the only air leg that relieves the operator of the lifting needed to steady the drill in operating position.

The Long Tom consists of a balancing air cylinder and an extensible air cylinder. Adjusting a 4-way pressure valve regulates the air in the balancing cylinder. Air power,



instead of man power, then supports the rock drill, whether it is retracted, partially extended, or extended the full 9 ft. The extensible air cylinder maintains the drill point in constant contact with the rock.

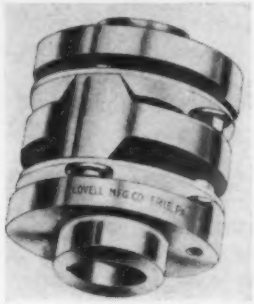
The Long Tom can be crawler-, rail-, or tire-mounted and single- or multiple-deck rigged. **(359)**

● An air-operated sump pump, Size 225, that is manufactured by Ingersoll-Rand, can be carried by one man and operated on the moderately low volume of air supplied by a small portable compressor. It can handle clear or dirty water, oil, sewage, or light sludge.

The sump pump is 16¼ in. high including air strainer, will pass through an opening 7½ by 9⅜ in., and weighs 33¾ lb. The unit has a rated water delivery, at 90 p.s.i., from 197 g.p.m. at 10 ft. head, to 68 g.p.m. with an 80 ft. head. The pump cannot be damaged if the sump is pumped dry. **(360)**

● Three types of a new flexing member, coupling together with the Farrell-Birmingham type DL Gearflex Coupling, are being offered by the newly established Flexible Coupling Division of Lovell Manufacturing Company.

The new couplings are designed around the flexing characteristics of a nonmetallic material, "Lovellex." The modulus of elasticity and the flexural fatigue strength of the new



synthetic reportedly exceed that of steel. Stocked units of the Lovell couplings are available for shaft diameters from ½ to 3½ in. and for hp. per 100 r.p.m. requirements from .3 to 29.0. Other sizes and ratings are available.

The couplings require no lubrication. Other features include compact size, light weight, zero backlash, and minimum power transmission loss. **(361)**

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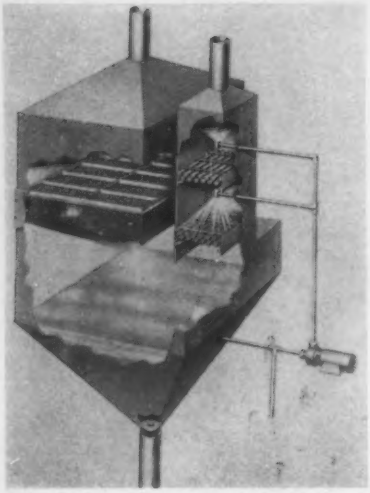

● A scrubbing system, the L-S Air Scrubber, that promises an economical solution to dust collection problems for mining and quarrying operations is being marketed by Antipol Corp.

The new unit utilizes a water spray over stainless steel screening to entrap impurities. Discharged air can be recirculated in the plant or released to the atmosphere without risk of contamination. As there are no moving parts maintenance is reduced. Pressure drop of the air entering the system is low, which reduces power requirements. The self-cleaning design permits constant operation.

The air scrubber was developed through a research program, including the installation of large scale units in typical plants in various industries. Completeness of dust recovery is as high as 99 percent, and the water consumption as low as 1 g.p.m. per 1,000 c.f.m. of air.

Simplicity of design is reported to keep down installation costs. **(362)**

● A fractional horsepower speed reducer, smallest in the "Torque-Arm" line, is being introduced by Dodge Manufacturing Corporation.

The new unit, the TDO25, has a gear ratio of 25 to 1, and will transmit up to .95 horsepower at the maximum recommended output speed of 85 r.p.m. A predetermined combination of reducer and V-belt drive can provide any speed ratio up to 175 to 1.

As a shaft-mounted reducer it is equipped with a torque arm for simple adjustment of V-belt drive center distance. Overload release is optional. When used as a flange-mounted reducer it can be bolted directly to the driven machine or supporting structure.

The standard TD025 reducers are bored for mounting on 1½-in. shafts, and bushings can be furnished to adapt for smaller shafts. Also available is a special TD025 bored for $1\frac{3}{16}$ in. shafts. **(363)**

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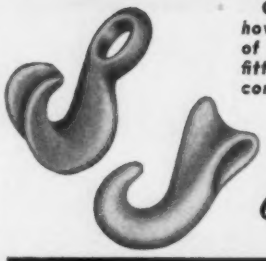
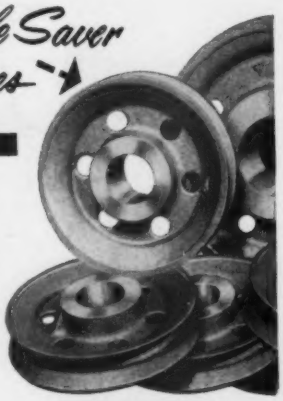


Cable Saver Grooves



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SNATCH BLOCK SOCKET

STANDARD TYPE SOCKET

Sheaves with Cable Saver Grooves and unmatched resistance to fatigue and wear ★ Choker Hooks of great strength and utility ★ Standard, Wedge Type and Snatch Block Sockets of many performance features ★ Clips, Thimbles and Eye Hooks . . . all electric furnace cast from Farrell-Cheek carbon and F85 alloy steels.

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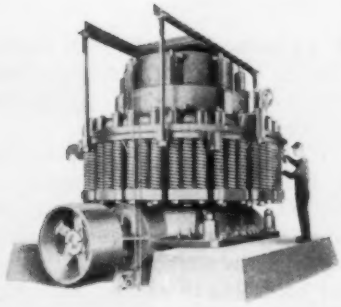

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- Low Initial Cost
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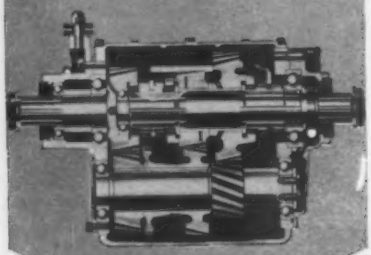
- Flexibility of Ratios



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For the right transmission for every operation

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Specify the MODEL

FULLER TRANSMISSION DIVISION
EATON MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN

Enter 72 on card, page 181

● Dodge has introduced its 1962 line of trucks featuring a new compact delivery unit, new styling, increased driver comfort and handling ease, improved operating economy, and greater vehicle reliability and durability.

The 1962 line has 141 basic models, including conventional-cab, LCF, forward-control chassis, 4-wheel-drive, school bus chassis and tandem units.

A highlight of the new line is a compact, ½-ton, forward-control delivery unit which provides top maneuverability and a short turning radius.

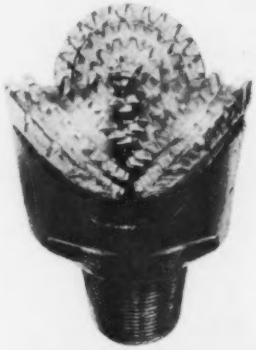
Featuring a 104-in. wheelbase and a maximum g.v.w. rating of 5,100 lb., it is available with either of Dodge's Inclined 6-cylinder gasoline engines—the 225-cu. in. 140-hp. model or the 170-cu. in., 101 hp. version.

Eleven gasoline engines, ranging from 101 to 228 hp. are offered. Four 6-cylinder engines are available with hp. ratings from 101 to 140. Truck operators may choose from seven V-8 engines with 178 to 228 hp.

The manufacturer reports that for the second consecutive year, Dodge is the only truck manufacturer to offer Inclined 6-cylinder gasoline engines which enable design for low hood height and maximum engine accessibility.

Seven Cummins diesel engines are available in the 1962 line, ranging from 160 to 250 hp. A closed crankcase ventilating system is standard on all 8-cylinder, 4-wheel-drive models; on C-500 units with the 318-cu. in. V-8 engine; on units with the 361 and 413-cu. in. V-8 engines; and on model WM-300. It is optional on all other gasoline models. **(364)**

● The VQM 3-cone rotary rock bit designed for blasthole drilling in quarries and mines by Varel Manufacturing Company is suitable for air or fluid drilling.



The VQM cone reportedly permits larger bearings, which allow increased weights to drill harder sections. The cones have somewhat square teeth, instead of rectangular chisel-shaped teeth. This results in more cross-sectional area at the end of the tooth from the time the bit is new until it is completely worn out.

When drilling bits are generally run until 75 to 95 percent of the tooth is gone the total footage seems to be in direct proportion to the amount of tooth metal to be worn away. It was for this reason, that the VQM was developed and, according to the manufacturer, has given more total footage without sacrifice of penetration rate. **(365)**

● An economical new high density blasting agent that obtains a high velocity is announced by Austin Powder Company.

Called Austinite 30, it possesses a density of 1.2 and a speed of 14,000 f.p.s. The manufacturer reports that blasting agents employing primarily ammonium nitrate had not been able to achieve such high detonation rates when density was 1.1 or above.

Priming Austinite 30 can be accomplished by the use of Austin ACP primers or regular dynamites and gelatins.

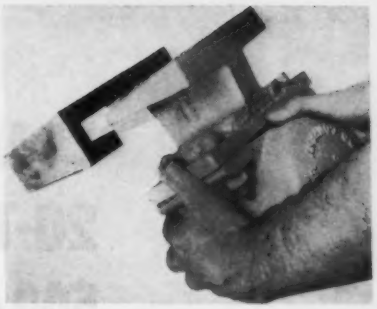
Austinite 30 is offered in spiral wrapped fiber containers 4½ in. to 9 in. in diameter. Similar packaging is available for Apcomite 30, a companion product with a self-contained primer. **(366)**

● One-cu. yd. capacity hoppers, manufactured by Roura Iron Works, solve the problems presented by incoming bulk materials for a plant geared to shipping bagged products. Each hopper holds approximately 2,400 lb. of material.

A boxcar or truck is spotted alongside the loading dock to receive a bulk shipment. A fork truck positions one of the hoppers beneath the discharge chute of the storage bin (illustrated) or places it next to a valve-type bag packer. To empty the hopper, the fork truck operator trips release handle on the rear of the hopper, permitting

the hopper to rock forward and dump. The hopper automatically returns to an upright position and locks, ready to be returned to the reloading point. **(367)**

● Pressurized lubrication is available from Spray Products Corporation. Packaged in a 16-oz. can, the material provides clean lubrication anywhere needed, such as bearings, pumps, rollers, springs, guides, brake parts, and couplings. It is sprayed from a distance of several inches, in short bursts, and allowed to set. The material will protect metal surfaces, and lubricate hard to reach areas. **(368)**



● A portable, light duty electric vibrator for moving materials from bins, hoppers and trucks is being offered by The Cleveland Vibrator Company. Similar in mounting characteristics to railroad car vibrators, the RC-5 LSRR attaches with a cast iron wedge and bracket to permit dismounting.

The unit can be lifted from its bracket mounting and moved to any location where vibration is necessary. The bracket is welded to the side of the bin, hopper, or truck. Extra brackets are available at the time of purchase, or as additional applications occur. The vibrator eliminates the need for one type of vibrator for bins and hoppers, and another for unloading trucks.

The RC-5 LSRR weighs 40 lb., can deliver and impact up to 275 lb. and produce 3,600 vibrations per minute. A 9-ft. lead of heavy duty motor cable with a water-tight disconnect plug is furnished with each unit.

The model is available for operation on 60 cycle, with single or 3-phase current and 110, 220, 440, or 550 v. **(369)**

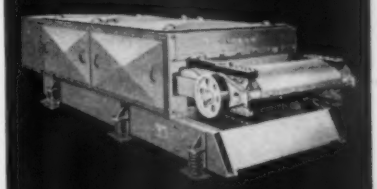
● Overstrom & Sons, Inc., manufacturer of vibrating screen equipment, has announced the availability of a new unit, called the Series 500 vibrating screen. Designed especially for lighter-duty screening requirements for sizing, scalping, and dewatering applications the Series 500 has a lower purchase price, yet retains all of the basic design and operating characteristics of the larger Overstrom Series 1000 vibrating screens.

Features include a unitized vibrator cartridge, easy amplitude adjustment, 98 percent vibration isolation, push-type tapered bearing removal sleeves, and double piston ring grease seals. **(370)**

SYMONS®

"Type F"

HORIZONTAL VIBRATING SCREENS



...FIRST CHOICE FOR DEPENDABLE ASPHALT PLANT SERVICE

Most asphalt plant builders use Symons Screens.

A Symons Type F Double Deck Screen will make from two to four-bin bituminous mix specifications. An added intermediate or drop deck will serve for very fine mixes or five-bin plants without increasing the minimum headroom requirements of the horizontal deck unit.

If your plant lacks capacity or ability to meet specifications at low cost, ask us how a Symons Screen can solve your problem.

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD.

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NORDBERG
MANUFACTURING CO.
Milwaukee 1, Wisconsin

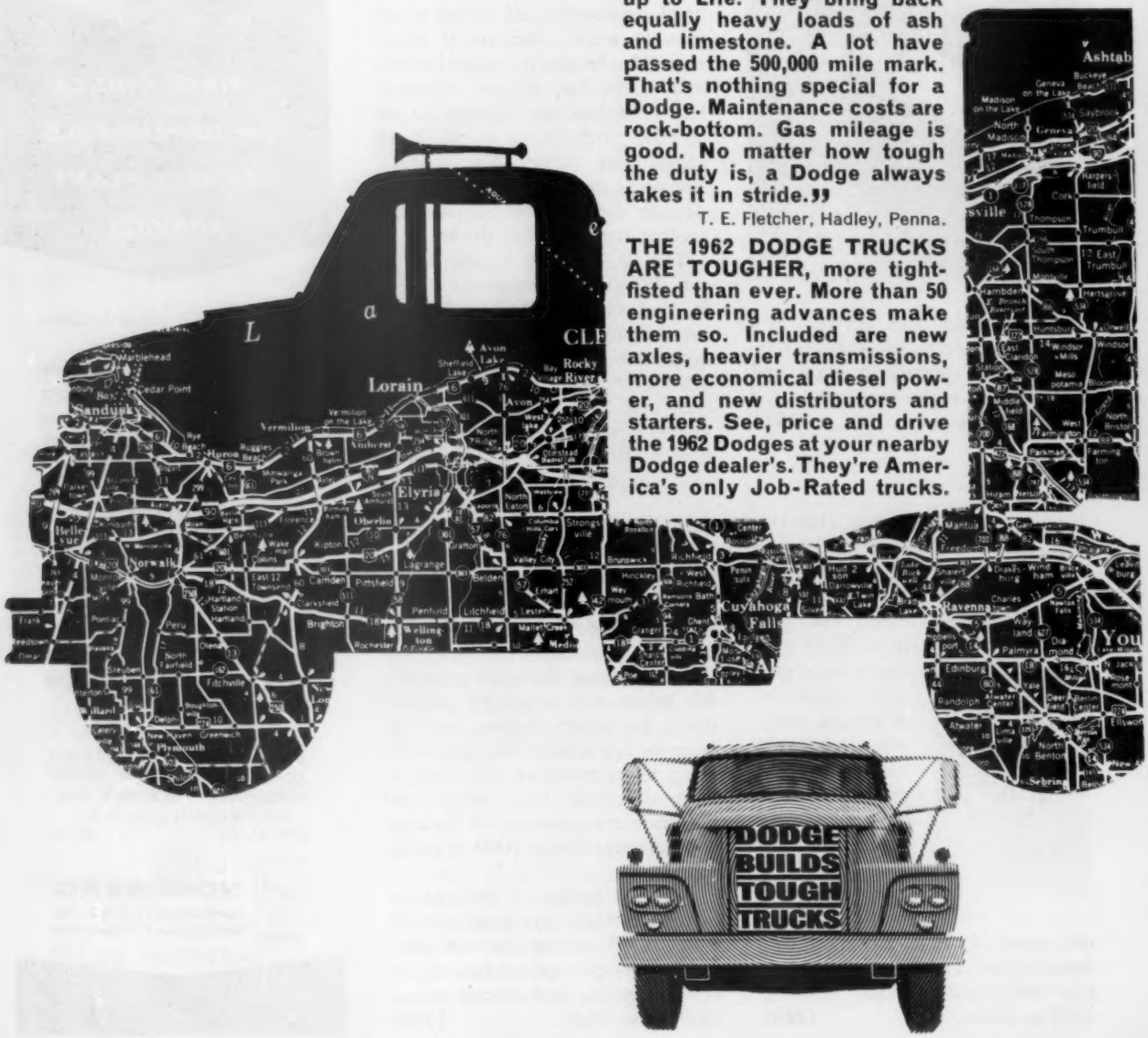
Enter 73 on card, page 181

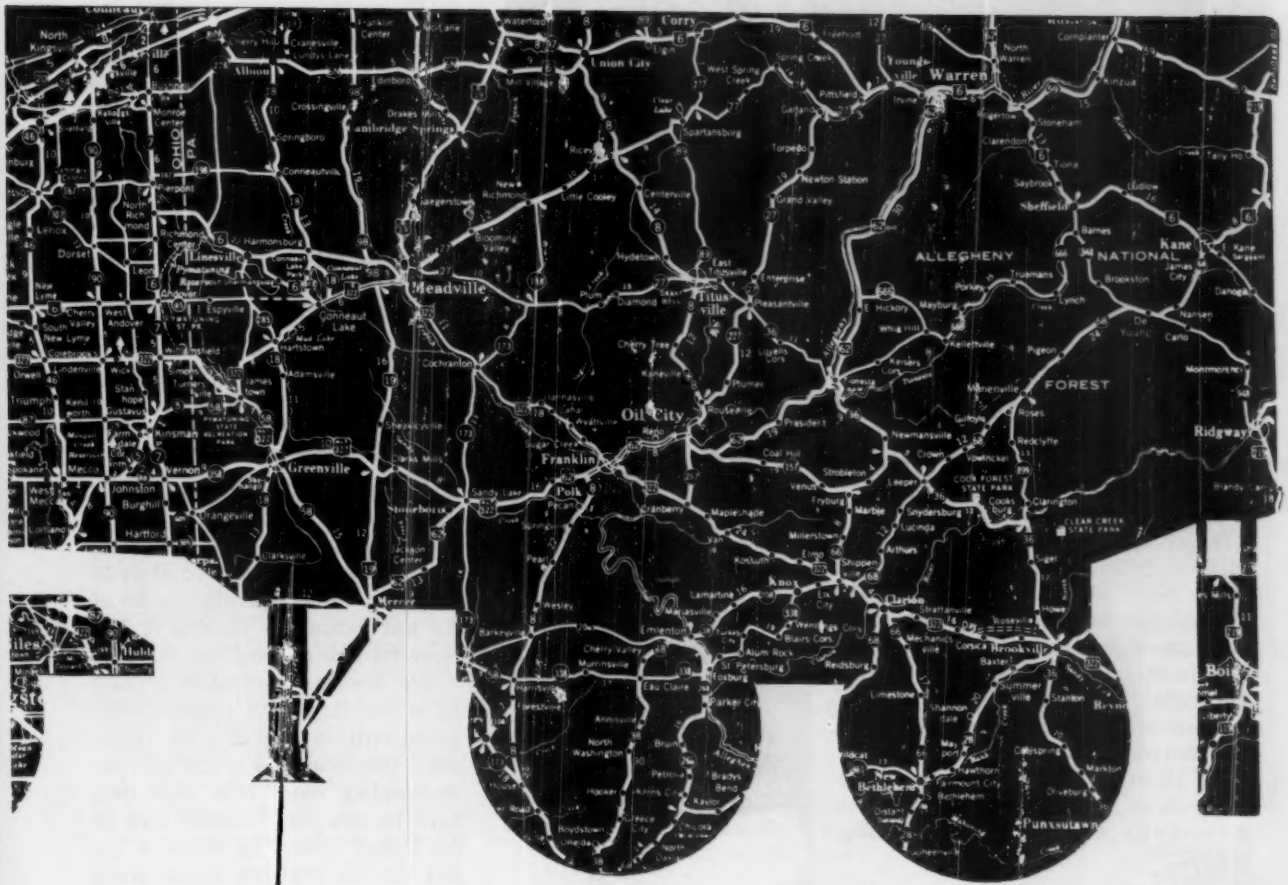
"HAULING 20-TON LOADS 500,000 MILES? NOTHING SPECIAL FOR A DODGE!!!

I own ten Dodge trucks and tractors. Many haul 20-ton loads of coal from strip mines up to Erie. They bring back equally heavy loads of ash and limestone. A lot have passed the 500,000 mile mark. That's nothing special for a Dodge. Maintenance costs are rock-bottom. Gas mileage is good. No matter how tough the duty is, a Dodge always takes it in stride."

T. E. Fletcher, Hadley, Penna.

THE 1962 DODGE TRUCKS ARE TOUGHER, more tight-fisted than ever. More than 50 engineering advances make them so. Included are new axles, heavier transmissions, more economical diesel power, and new distributors and starters. See, price and drive the 1962 Dodges at your nearby Dodge dealer's. They're America's only Job-Rated trucks.





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Need replacement V-Belts?

Reliability of Gates Hi-Power V-Belts makes them industry's No. 1 choice

The exclusive construction features of Gates Hi-Power V-Belts—the Concave Sides (U.S. Patent No. 1813698), the Arched Top, the Flex-Bonded Tensile Member—make them more dependable than ordinary, conventional V-belts. They give you long belt life on even the toughest applications.

Moreover, because of Gates high standards of quality control, you get a perfectly matched set of Hi-Power V-Belts every time—every belt pulls its share of the load throughout the service life of the drive, further increasing belt life.

You will get fast delivery of Hi-Power V-Belts from the local stock of your nearby Gates Distributor. Call him today.

The Gates Rubber Company
Denver, Colorado

BP 60

Gates Hi-Power V-Belts

Enter 76 on card, page 181

Washington News Letter

(*Concluded from page* 11)

jawbone technique. Any insistence that the next labor agreement in the steel industry include no significant wage increase is certain to be resisted and even fought.

It is likely that this approach will be found to yield less than complete results. Although it may have avoided the type of across-the-board price increase which occurred repeatedly in the past, a number of price increases are expected on particular items, especially in a market where resistances may be low.

Equally realistically, some wage increase is expected to result from the next round. It is the Administration's hope that the jawbone approach will contain these movements within the bounds which will make legislatively imposed controls unnecessary.

Without any law to back him up, the President is using the power of his office to achieve both price and wage controls. If he succeeds, he will have proven that the power of the jawbone is far greater than anyone suspected.

Labor Developments

(*Continued from page* 13)

add little, if anything, to their already overpowering strength. Nor has it been suggested that their motivation is altruistic in that they are likely to find great virtue in sharing the lot of the less fortunately situated or less powerful International unions.

The principal motivation appears to be the desire for respectability, particularly on the part of the Teamsters' president and a few officials surrounding him. Now that they have become the "cleanest men in the United States" by virtue of the fact that the evidence against them has been either so inadequate or so inadequately presented that in the courts they have not been convicted of crimes, they would like to have the mantle of respectability conferred upon them by their peers, that is, by those labor union officials who now wear the mantle.

But respectability is a curious

thing. It is almost impossible to confer respectability on someone who has not earned it; and if he has earned it, it doesn't have to be conferred. A review of the deliberations and actions of the Teamsters convention, which was conducted along such proper procedural lines, fails to reveal the adoption of a program designed to earn the desired respectability.

If the matter of the Teamsters and Hoffa were not so deadly serious—serious enough to involve the Congress, a Cabinet Member and even the President—it would make a wonderful subject for a work of social satire in the best tradition of Gilbert and Sullivan.

Light Aggregate Obtainable From Ugly Coal Refuse Piles

Three U. S. Bureau of Mines spokesmen have reported on studies made in co-operation with two commercial coal producers, stating that some coal washery refuse can be converted into satisfactory aggregate for use in the manufacture of lightweight concrete blocks by burning on a chain-grate stoker.

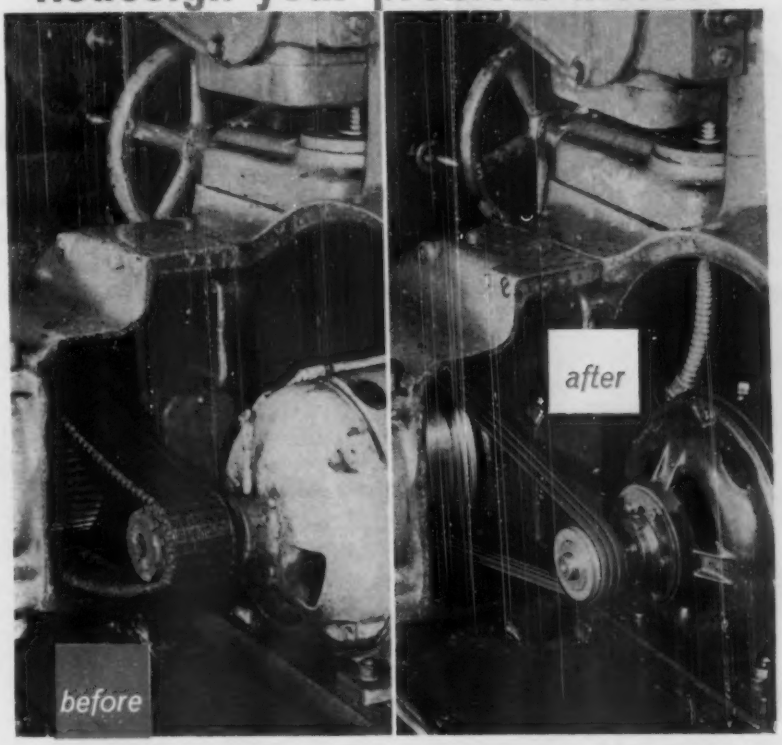
Their paper was read at the 24th annual joint solid fuels conference, sponsored by the Coal Division, Society of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers, and by the Fuels Division of The Society of Mechanical Engineers.

The authors were J. H. Myers, Chemical Research Engineers; J. J. Pfeiffer, supervising chemical engineer; and A. A. Orning, supervising technologist (fuels). All are stationed in Pittsburgh, Pa.

The feasibility of using coal washery refuse in the manufacture of lightweight aggregate for building materials was carried out with the Truax-Traer Coal Company at Ceredo, W. Va., and the Carbon Fuel Company, Charleston, W. Va.

Victor Chemical Works, Chicago, paid $57,579 for phosphate mined from the Mt. Pleasant, Tenn., city airport property.

Redesign your problem drives...



How Gates Super HC Drives are reducing drive down-time

If you have a chain, gear, flat belt or conventional V-belt drive that is causing costly production down-time or high maintenance costs, a Gates Super HC High Capacity V-Belt Drive can be your answer.

Because of exclusive changes in V-belt shape, construction and materials, a Gates Super HC Drive can handle the same power as a conventional V-belt drive in ⅔ to ½ the space—with fewer belts and smaller, lighter-weight sheaves. As a result, bearing loads are less, giving increased bearing life. Also, it is often possible to eliminate outboard bearings and jack shafts, reducing the number of elements present to cause drive down-time.

Moreover, Gates Super HC Drives absorb machine-damaging vibration and shock. Multiple belts assure you of continuous operation, further cutting costly machine down-time.

The Gates Man near you is a drive design expert. Ask your nearby Gates Distributor for his help when you have a drive problem.

The Gates Rubber Company
Denver, Colorado
SP-61

Gates Super HC Drive saves space, weight and money

Exclusive design features include: precisely engineered Arched Top, Concave Sidewalls, Flex-Weave cover, super strength tensile construction.

Gates

Building the future on 50 years of progress

Gates Super HC V-Belt Drives

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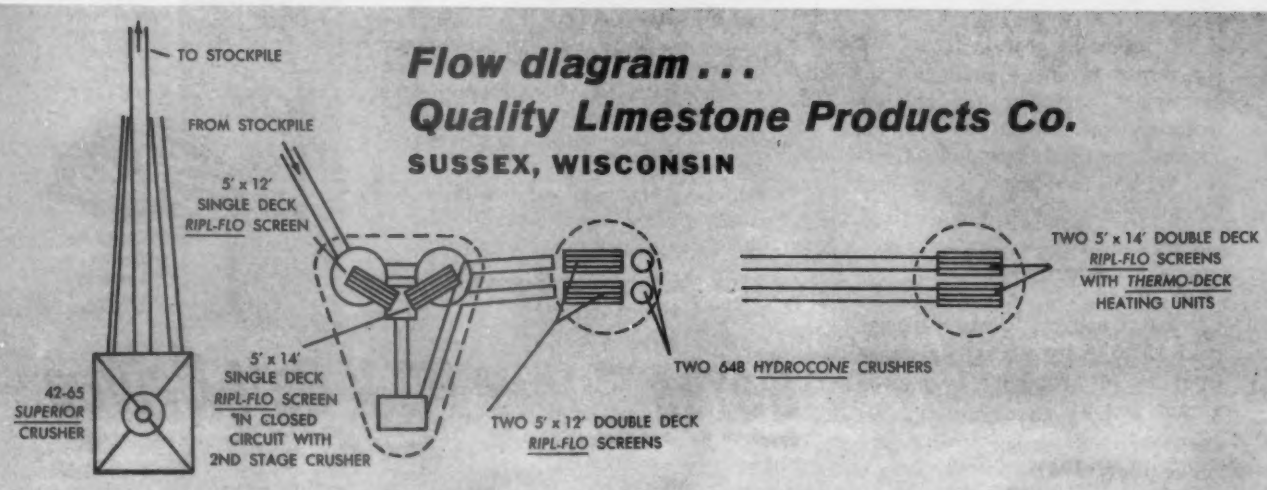
"Allis-Chalmers really


TO STOCKPILE
FROM STOCKPILE
5' x 12' SINGLE DECK RIPL-FLO SCREEN
5' x 14' SINGLE DECK RIPL-FLO SCREEN IN CLOSED CIRCUIT WITH 2ND STAGE CRUSHER
42-65 SUPERIOR CRUSHER
TWO 5' x 12' DOUBLE DECK RIPL-FLO SCREENS
TWO 648 HYDROCONE CRUSHERS
TWO 5' x 14' DOUBLE DECK RIPL-FLO SCREENS WITH THERMO-DECK HEATING UNITS

Flow diagram . . .
Quality Limestone Products Co.
SUSSEX, WISCONSIN

Quality Limestone Products Co. tells success story ... how Allis-Chalmers equipment and recommendations helped build business from a small beginning in 1948 to Wisconsin's largest crushed stone plant today. It is also a major producer of all types of building stone and agricultural limestone.

"It sure chews up the rock." That's how Mr. Lloyd Wolf — president of Quality Limestone Products Company, Sussex, Wisconsin — describes his new 600 tph *Superior* 42-65 gyratory crusher. The excellent performance of this rugged, dependable unit is no surprise to Mr. Wolf. He says, "We've used A-C crushers ever since we started in business—they've certainly helped us keep costs in line."

One of Quality's first crushers was a 48" *Hydrocone* crusher. It is still in use today, along with a newer 648 *Hydrocone* machine, for tertiary crushing. Both crushers are equipped with *Hydroset* control — an exclusive A-C feature that regulates product size instantaneously and automatically releases tramp iron.

"Allis-Chalmers," Mr. Wolf relates, "helped us right from the start. They showed us how to set up an efficient plant, and haven't stopped helping us since." One A-C recommendation was the addition of a surge pile after the primary crusher. This enables Quality to utilize machinery and manpower more efficiently.

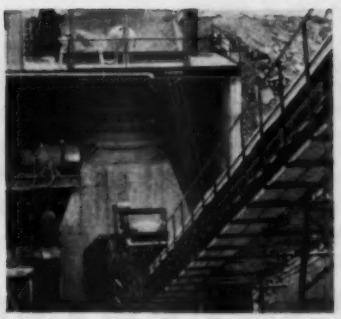
Mr. Wolf's plant is also equipped with A-C vibrating screens. He is pleased with their dependability and rugged construction.

The success story of Quality Limestone Products Company is typical among A-C customers. Perhaps we can help *you* achieve better profit and growth, too. Call in your A-C representative. Or write **Allis-Chalmers,** Milwaukee 1, Wisconsin. A-1541

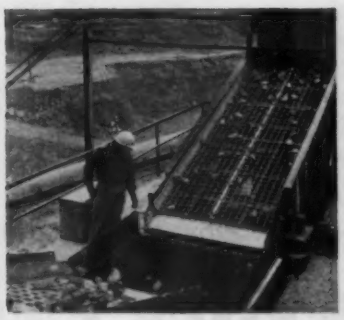
Superior, Thermo-deck, Hydroset, Ripl-Flo and Hydrocone are Allis-Chalmers trademarks.

helped us grow!"

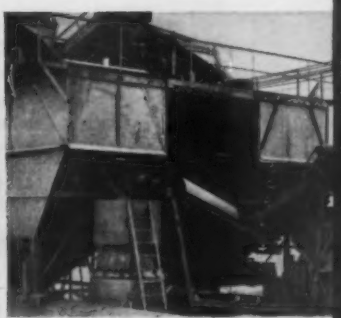
Overall view of quarry, showing surge pile at extreme right.



SUPERIOR primary crusher handles up to 600 tph of dolomitic limestone.



RIPL-FLO screens in closed circuit with second stage crusher.



HYDROCONE tertiary crushers with 2-deck RIPL-FLO screens.

ALLIS-CHALMERS

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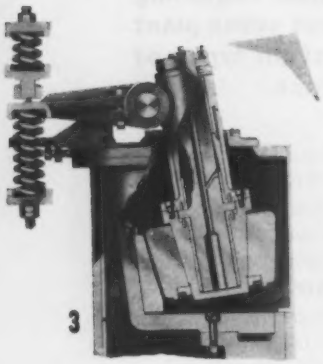
RAYMOND BOWL MILLS

1



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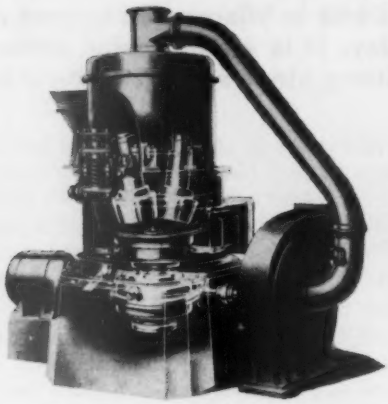
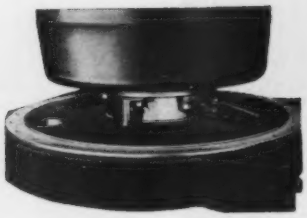
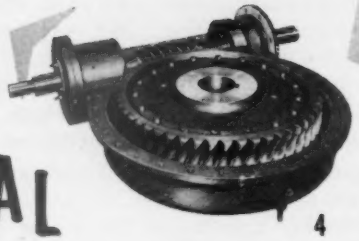




2

almost PERPETUAL MOTION...



4

THE CONTINUOUS, ROUND THE CLOCK, OPERATION OF RAYMOND BOWL MILLS BORDERS ON PERFECT AUTOMATION.

Capacities of over 18 million tons annually, with 390 units in use on kiln firing alone, is the record set by Raymond Bowl Mills in the handling of coal . . . any grade or moisture content.

Bowl Mills have high availability and wide range capacity.

Flexible control of a noiseless and dustless operation with low maintenance is assured.

Widespread application has been made on rotary kilns for Cement, Lime, Dolomite and other products. Kilns provide increased production, superior product quality, lesser fuel costs and maximum burning efficiency with overall operating economy.

These important parts are largely responsible for maintaining the constant, smooth, highly efficient performance of the Mill.

1. The Revolving Bowl directs the coal between the rolls and the grinding ring by centrifugal force, providing maximum grinding efficiency with minimum load of unground material.

2. Tramp Iron, Pyrite, Slate and other foreign materials are automatically and continuously removed from the mill through the Reject Spout.

3. The Journal Assembly has trunnion and spring pressure mechanism for adjustment of grinding pressure between roll and bull ring. The sliding saddle on top plate is adjustable from outside to align roll and compensate for any wear.

4. A precision built Worm Gear Drive that runs in a bath of oil, giving a smooth, quiet, vibrationless operation.

The Bowl Mill is a rigidly constructed, proven machine with a renowned record of performance, backed by an organization with over a half-century of experience in manufacturing pulverizing equipment.

Having a MILL under finger-tip control with day in and day out operation that approaches perfection is practically like having Perpetual Motion.

FOR DETAILS SEND FOR RAYMOND BOWL MILLS CATALOG 75 Q

COMBUSTION ENGINEERING, INC.

Raymond Division

Combustion Engineering-Superheater Ltd.
Montreal, Quebec, Canada

Sales Offices in all Principal Cities

427 WEST RANDOLPH STREET • CHICAGO 6, ILLINOIS

USS Grinding Balls are delivered fast!

No delivery problems. We don't actually throw grinding balls at our customers—but you can call the shots and we'll ship them fast—all the balls you need, exactly when and where you need them.

No selection problems. You can order from a complete stock of USS Carbon-Manganese and USS Alloy Steel Balls, in ten sizes ranging from ¾" to 4".

No performance problems. USS Grinding Balls are hard, tough, and uniform from ball to ball and load to load. Recently completed hardness surveys under direction and control of USS Research Center proved that maximum depth of hardness consistent with toughness is provided by our product in both carbon and alloy grades in all sizes. You cannot buy a better ball for your purpose!

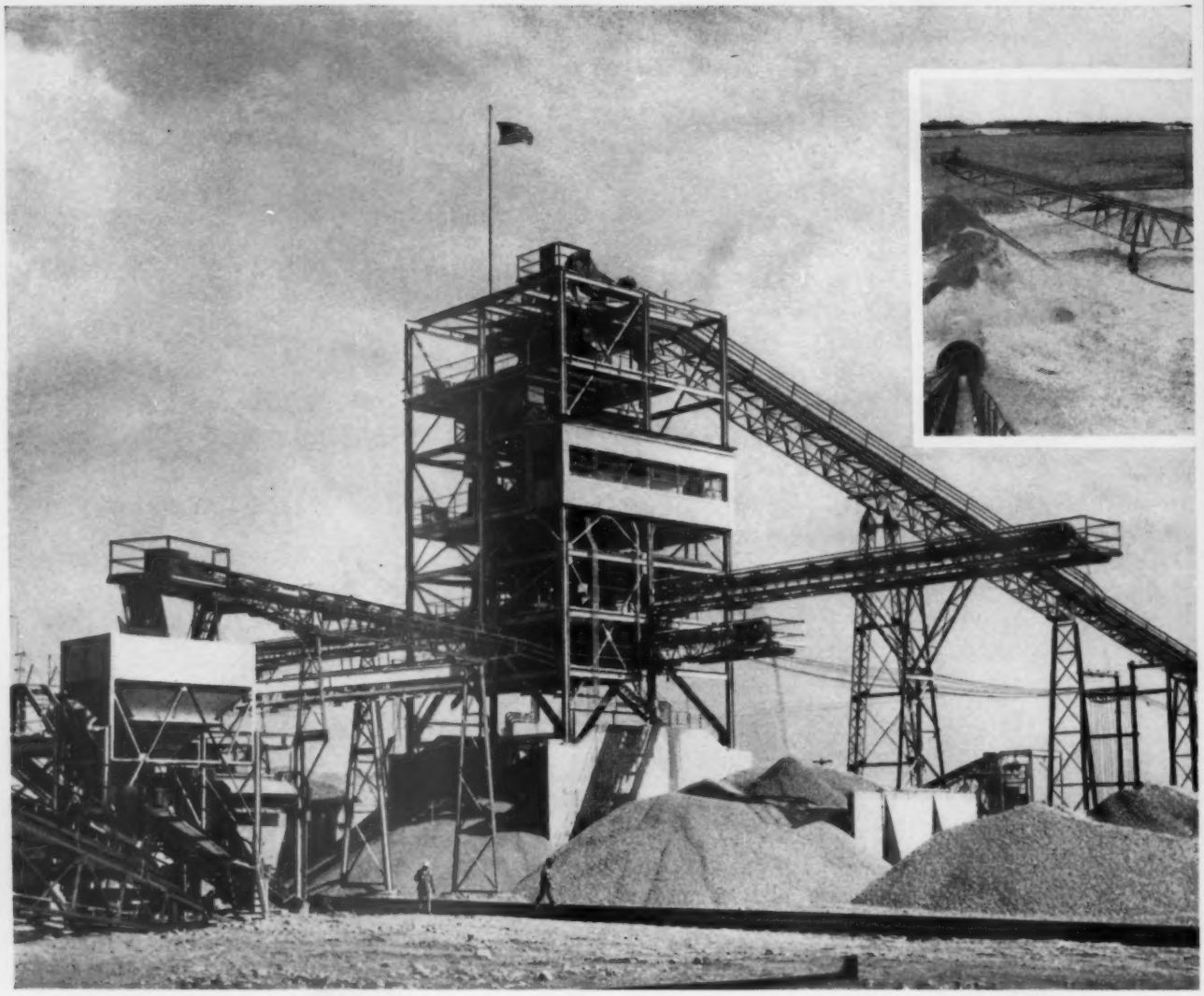
Solve your grinding ball wear problem by calling our nearest Sales Office or United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal & Iron Division • United States Steel Export Company

This mark tells you a product is made of modern, dependable Steel.

United States Steel USS

TRADEMARK



MAIN SCREENING TOWER gives exact gradation without guesswork. Any of six sizes of stone plus sand can be reclaimed and blended to rigid specs by pushbutton or manual operation. When plant is on automatic operation, each feeder is started individually and equipment is interlocked to prevent material pile up.

PANORAMIC VIEW shows how Barber-Greene conveyors handle material from pit to railroad cars or trucks. Field conveyors are hopper loaded and bring pit-run to primary crusher where 227′ fixed stacker builds active surge pile to 6,000 ton capacity. Inclined conveyor under surge pile charges secondary crusher. Any oversize material from first crushing is automatically fed onto parallel return conveyor which feeds back to main conveyor. A 310′ inclined conveyor charges main washing and screening plant. Six other conveyors stockpile and reclaim sized materials.

147′ RADIAL STACKER stockpiles sand which is then reclaimed to loading-out bins by 346′ inclined conveyor originating under stockpile.

120′ FIELD CONVEYORS were specifically designed for this plant, each being constructed of rigid truss with only two points of suspension. Each of seven units weighs 9 tons and has two lifting bales that permit fast relocation with shovel that feeds hopper. Conveyors first operated on surface and were loaded by dragline. Units now work in pits and are shovel loaded.

ACTIVE SURGE PILE with 6,000 tons capacity allows independent operation of pit and screening plant. Fixed stacker 277′ long builds pile.

AUTOMATED VULCAN CORP. PLANT CUSTOMIZES HUGE OUTPUT

16 Barber-Greene conveyors help give gigantic aggregate supermarket flexibility needed to let customers write own gradation tickets

Here's proof officials of Consumers Co., Division Vulcan Materials Corp., knew exactly what they were doing when selecting a layout for this Crystal Lake, Ill., plant.

- After five years, plant production has increased steadily to present potential of 800 tph. This has been achieved with a layout featuring pit-to-plant conveyor haulage, an interlocked processing flow, a completely independent pit system with the entire operation controlled from just two points.
- Performance of field conveyors, originally selected over haul trucks, causes company officials to comment, "We feel use of field conveyors has resulted in considerable saving over truck haulage. Maintenance has been very satisfactory."

Sixteen Barber-Greene belt conveyors totalling 3,367′ comprise the material handling system that provides extreme flexibility of operation, fully automatic control and rigid control of gradation. This control lets the customer write his own gradation ticket.

Your Barber-Greene Conveyor Representative can deliver an equally profitable material handling system to your specs when you open new operations or expand old ones. That's what makes his conveyors the overwhelming No. 1 choice of pit and quarry operators.

MEMBER CEMA CONVEYOR EQUIPMENT MANUFACTURERS ASSOCIATION

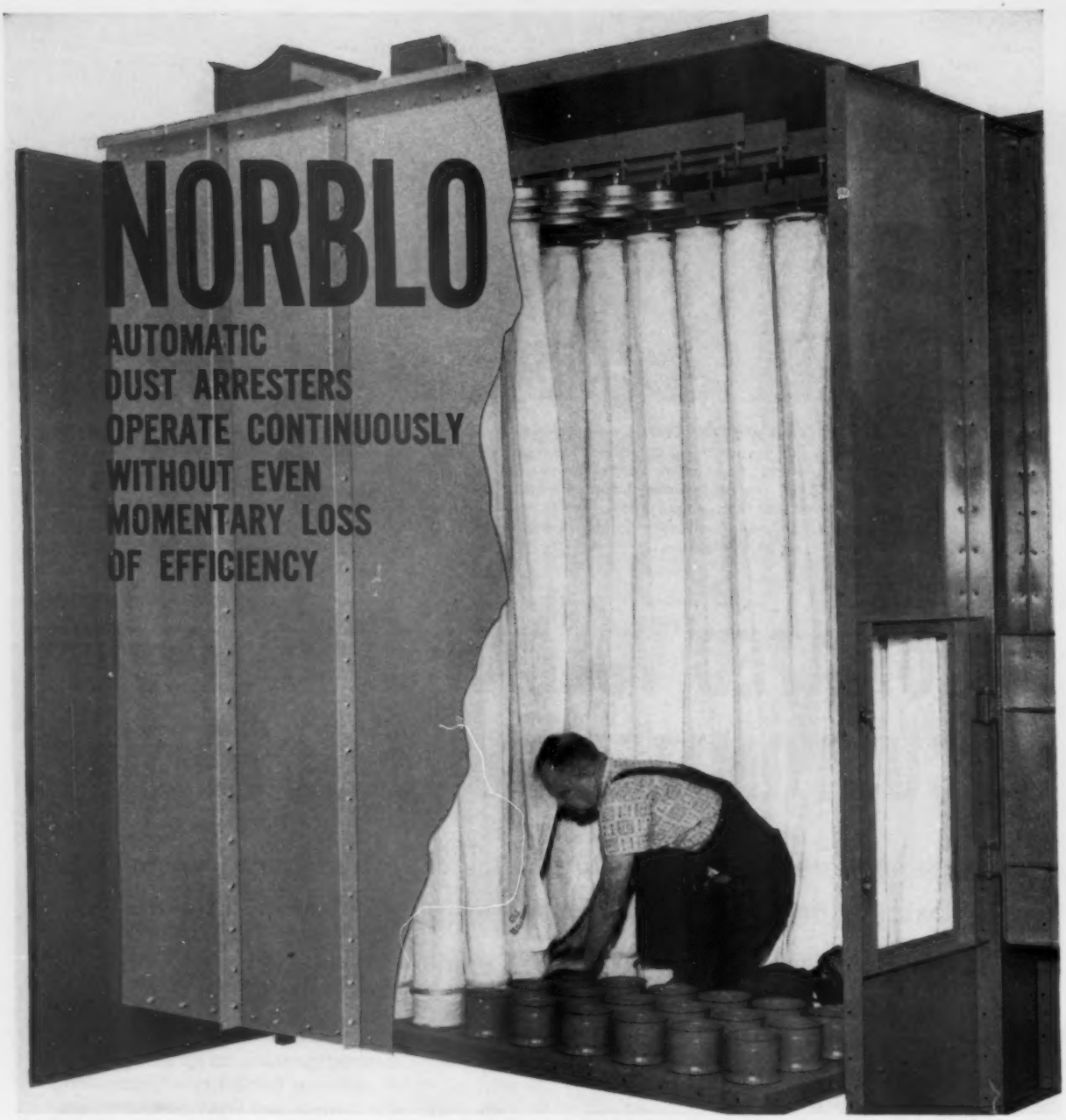
Your belt conveyor equipment headquarters

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT



Periodic cleaning, repair or replacement of bags, and minor maintenance can be accomplished while the collector remains in operation. One compartment, as shown above, can be isolated in the Norblo design, with all mechanical parts outside the gas stream. Continuous cyclic shaking, by compartment, allows operation without interruption. ■ This is why in modern plant operations you'll find an increasing preference for Norblo Automatic Bag Arresters. Where efficient production requires continuous operation more and more industries specify Norblo Dust Arresters. Over 80% of the cement industry relies on Norblo equipment for drying, grinding and finishing operations. ■ Buell-Norblo equipment can play an essential part in your process. Write for complete information on any type of dust collection problem. Buell Engineering Company, Inc., Dept. 18-K 123 William Street, New York 38, New York. Northern Blower Division, 6407 Barberton Avenue, Cleveland, Ohio. Electric Precipitators · Cyclones · Bag Collectors · Combination Systems · Fans · Classifiers.

buell Norblo®

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BIG APPETITE FOR ROCK PRODUCTS

For screening ease and speed, nothing matches the efficiency of Hendrick Perforated Metal screens. Large, precision perforations provide extra capacity for extra profits, eliminate blinding and assure accurate sizing. These heavy-duty high-carbon or heat treated steel screens are designed for continuous, wear-resistant service. They are available in flat or corrugated plate and in a wide range of round, square and hexagonal openings to suit your specific requirements. Furnished with standard hook flanges for easy attachment to any vibrator. Call your local Hendrick representative (he's listed in your Classified Telephone Directory under Metals, Perforated)—or use the coupon below for further information.

HENDRICK Manufacturing Co.
Carbondale, Penna.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens
Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel
Flooring • Shur-Site Treads • Armorgrids • Hendrick Hydro Dehazers

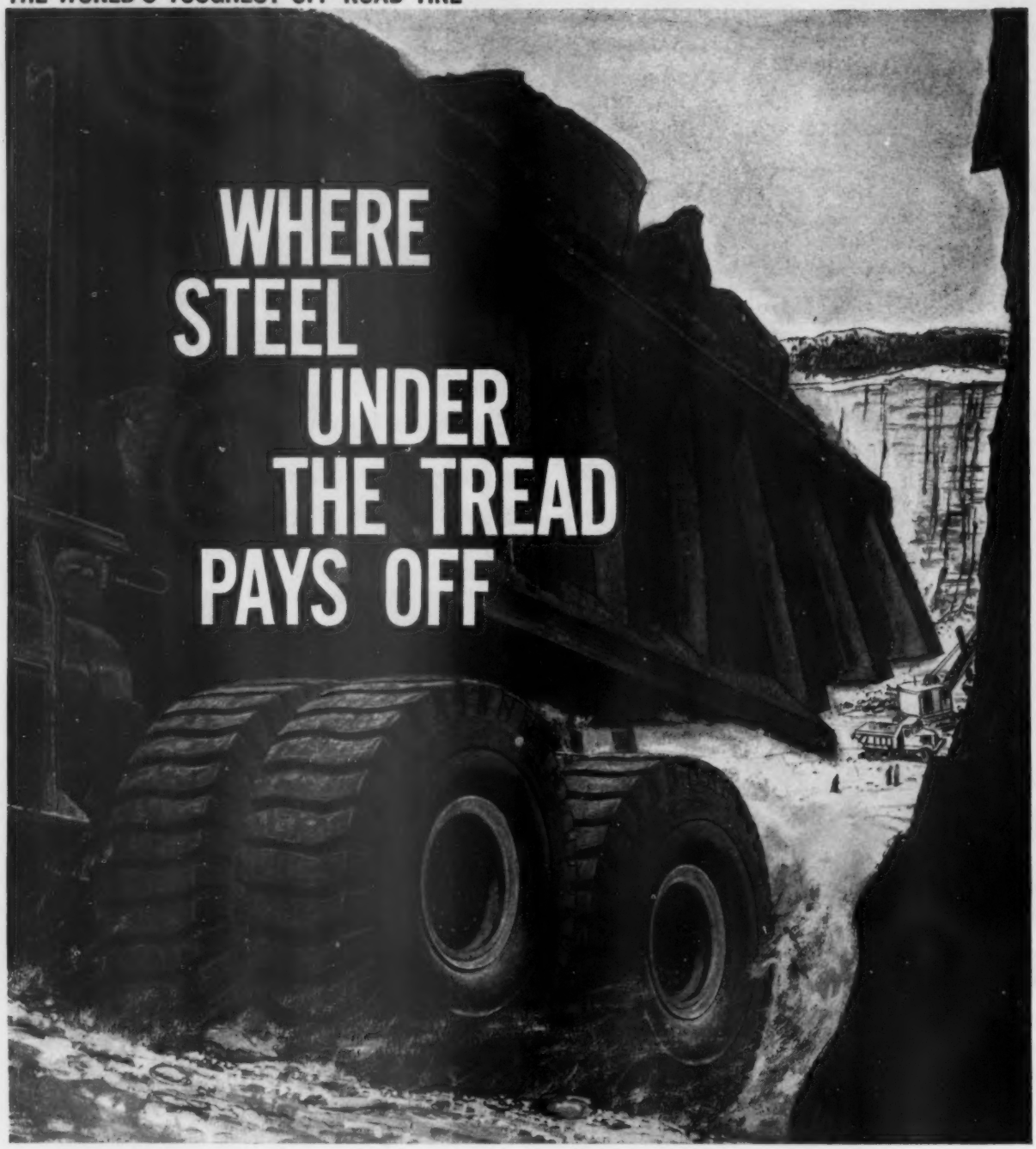
HENDRICK Manufacturing Company
Carbondale, Penna.

Gentlemen: I want more information on Hendrick Perforated Metal screens.

- ☐ Please have representative call.
- ☐ Please send FREE literature on Perforated Metal Screens.

Name_____
Title_____
Company_____
Street_____
City_____ State_____

THE WORLD'S TOUGHEST OFF-ROAD TIRE



U. S. ROYAL SUPER CON-TRAK-TOR S.R.T.* Deeper tread at center and shoulders—steel reinforced for "chain-mail" resistance to cuts and impact failures • Each brass-coated steel filament is rubber insulated—can't rust out • Double-strength nylon cord body • More durable carcass • More tires retreadable • Prove-test them on your present equipment, specify them for your new equipment. Call your U. S. ROYAL DEALER.

U.S. ROYAL SAFETY 1ST TRUCK TIRES

US RUBBER UNITED STATES RUBBER
Rockefeller Center, New York

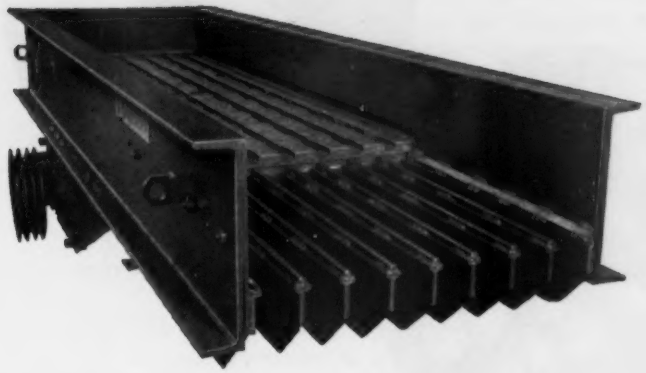
PROFIT 7 WAYS WITH

SIMPLICITY

GRIZZLY TYPE FEEDERS

1. FEED AND SCALP WITH ONE UNIT
2. ELIMINATE PLUGGING OF CRUSHER
3. REDUCE LOADING HEIGHT
4. PROLONG BELT CONVEYOR LIFE
5. LOWER MAINTENANCE COST
6. LOWER INSTALLATION COST
7. SAVE SPACE—COMPACT

Simplicity Grizzly Feeders are designed to convey and scalp in one operation, thus eliminating the costly apron feeder and separate stationary grizzly. Fines are scalped off and pass through the grizzly section, allowing only the oversize material to reach the crusher. Fines are deposited on the conveyor belt first, making a bed for the larger rock, thus contributing to longer belt life.



Simplicity Grizzly Feeders are spring mounted, which allows for heavy impact without damage to the machine. Impact bars will be added to the pan section at customer request. Side liners are standard at no additional cost.

Simplicity Grizzly Feeders are equipped with replaceable grizzly sections, which allows for various openings by simply changing deck sections, or the ALL NEW ADJUSTABLE Grizzly section which is so designed that one or more of the grizzly bars can be taken out, or added, to arrive at the opening desired.

Simplicity Grizzly Feeders are available in four separate models and in sizes for most operations.

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FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario.
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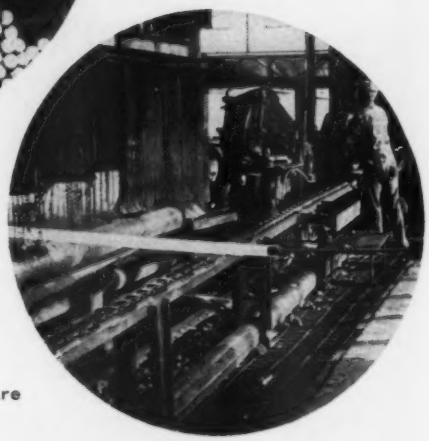
227

MORE MILLING MILEAGE



FOR YOUR MONEY—Coates Triple-Forged Carbex Grinding Balls will grind on and on in your mills turning out your product with greater efficiency, uniformity and economy. Coates Balls are built to be better . . . actual production tests proved they out-perform others costing much more.

Skill, quality materials, care and special equipment combine at Coates to make these rugged triple-forged grinding balls that offer *More Milling Mileage* . . . more profit to you. Bars of special formula, fine-grained, high-carbon steel are forged into perfectly round grinding balls that are tough to the core. Quality controls at every stage of manufacture assure that every Coates ball meets rigid specifications.

Get *More Milling Mileage* . . . improve your plant efficiency by specifying Coates Grinding Balls, precision products of proven performance.

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Write for prices . . .
All sizes ½" to 5" carried in stock for immediate shipment.

COATES STEEL PRODUCTS COMPANY

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA

The Editor's Page

Government "Gold Mine" of Information

IT WILL be a surprise to many to learn that the U. S. Department of Commerce has a $9 billion fund of research and patent information that is available to all businessmen. This sum represents the value of work by all government agencies, especially the Defense Department, that is being disseminated to business through Commerce Department reports. Added millions have been spent on marketing data to meet a variety of business information needs. Included is free information on (1) domestic marketing of products and services, (2) foreign outlets for American companies, (3) community development, and (4) government patents and technical research.

In the belief that many businessmen are not aware of the facilities offered them, the Department of Commerce is presenting an open invitation through a series of five Advertising Council advertisements appearing in space contributed by business publications, including PIT AND QUARRY. This campaign, entitled *Now's the Time to Get Growing in a Growing America,* was prepared by Grey Advertising, Inc., on a volunteer basis, in consultation with the Department of Commerce and the Business Paper Advisory Committee of the Advertising Council.

These services are available to businessmen through the Department's headquarters in Washington, D. C., and the 33 field offices located throughout the nation. These offices are playing an important role in the nation's export-expansion program by guiding more companies into this lucrative field, which yields the United States almost $20 billion a year, although less than 5 percent of American manufacturers are exporting.

ON THE domestic side, these field offices have helped many concerns to select the best locations for their businesses and to improve their marketing efforts.

The scientific capabilities of the Department through its various agencies are not generally known. The work of the National Bureau of Standards, the Weather Bureau, the Coast and Geodetic Survey, the Maritime Administration, the Bureau of Public Roads, the Office of Technical Services, and the Patent Office often has an important bearing on both business and defense.

The Bureau of Standards has for 40 years been promoting commodity standardization, to the great benefit of American business. The Weather Bureau has long provided important weather information and storm warnings. The Department's Office of Technical Services disseminates the unclassified reports of results for American business. The more than 200,000 OTS reports cover everything from fuel cells to skin-diving equipment and are carefully watched by industry for new ideas.

THIS public service educational campaign is both appropriate and well-timed. The 1960-61 recession is over, and the economy has begun to climb slowly upward. There is every reason to expect that it will reach new heights in terms of increased productivity and greater export trade and that the level of unemployment will drop. All that any American businessman has to do to tap the storehouse of information and advice offered by the U. S. Department of Commerce is to write to any one of its branch offices or to Washington, D. C. By doing so he will not only get direct benefit, but will also contribute to the upward trend of the national economy.

Walter E. Frauffer

Left:
FOUR BELTS IN THE CONVEYOR GALLERY, left, paired with one longer and one shorter unit in each pair, place the individual fractions on appropriate piles. These are transferred to the area at the right above a reclaiming and load-out tunnel conveyor.

Veteran Haydite Operation Meets Market Challenge

Cooksville-Laprairie expands, modernizes for efficiency and capacity gains

ANOTHER ON THE SPOT report

By BUREN C. HEROD

ONE of the oldest Haydite lightweight aggregate operations on the North American continent is an example to the "youngsters" in the industry of keeping pace with product technology and market growth. Just a year ago Cooksville-Laprairie Brick Ltd., Cooksville, Ont., completed an extensive modernization of its aggregate production facilities designed to accommodate an impressively expanding market, with peak production efficiency.

Significant goals attained in the project include greatly improved material-processing and handling systems, a gain in capacity of at least 50 percent, and the ability to blend "single" sizes into finished gradations as required at the time of shipment to minimize possible segregation.

With these improvements, the firm has materially enhanced its market position—which was already strong since the Cooksville site is ideally located with respect to many growth areas. In recent years increasing demands for Haydite have been registered by producers of concrete masonry. In the lightweight structural concrete field, the potential is now being tapped, with numerous high-rise buildings under construction.

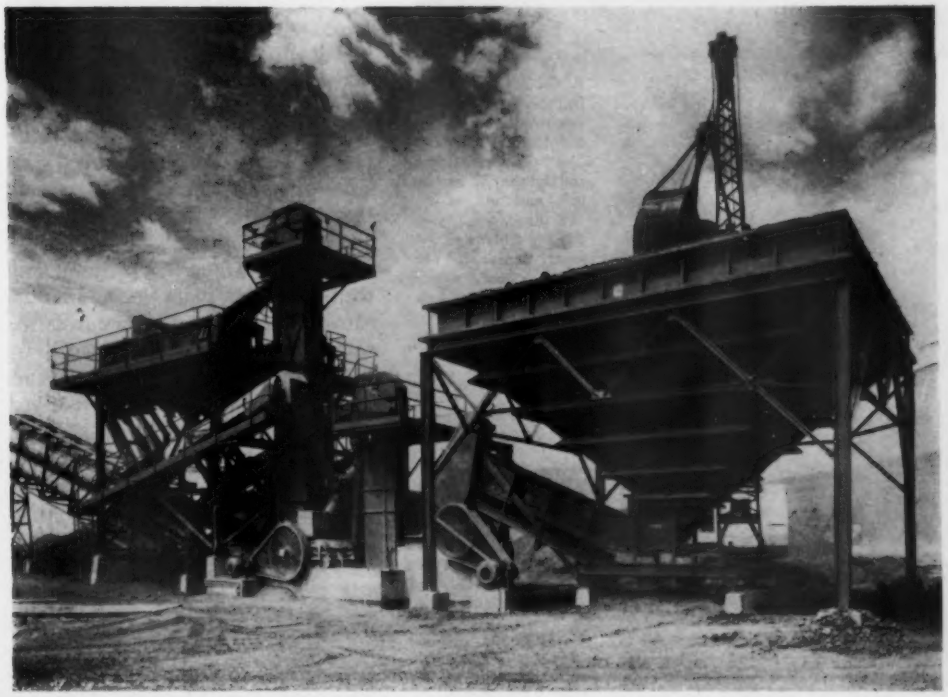
Cooksville-Laprairie, constantly working towards technological improvements and information, recently obtained a 4 hour and 40 minute fire endurance on 4-in. solid block protection to steel columns. A well equipped laboratory is maintained for routine quality control tests on aggregate and concrete and for trial mix proportions.

Markets are served by rail and truck and also occasional transoceanic shipments to Eastern Europe. The Montreal market, some 380 miles eastward, has been regularly served from Cooksville.

To assure the capacity and product quality required to meet the diversification and growth of lightweight aggregate markets, the company management undertook an improvement program. Upon completion last June only the kiln building remained of all the older structures in the approximately 35-year-old operation.

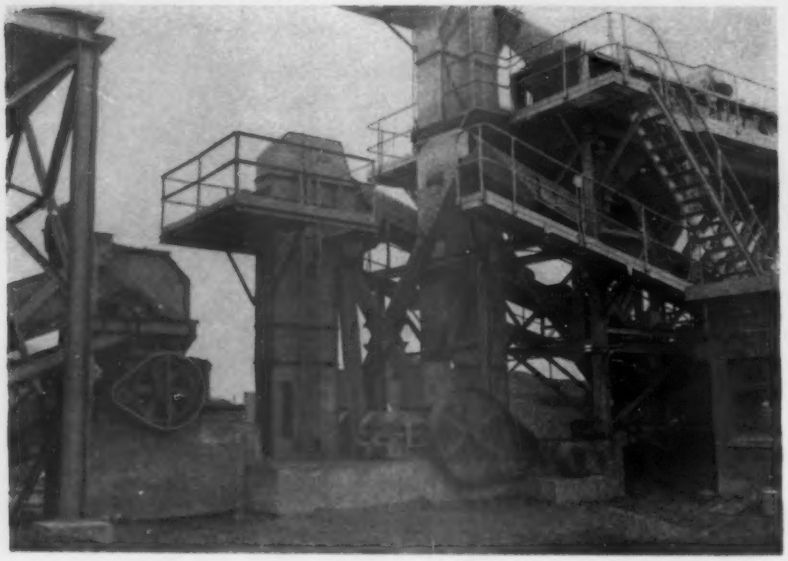
Nearly a year of planning and construction preceded initial operation of the new installation. Based

CAPACITY WAS RAISED at least 50 percent, and greatly improved processing and handling systems in Cooksville-Laprairie's new lightweight aggregate crushing and screening plant near Toronto have provided peak production efficiency and product flexibility.

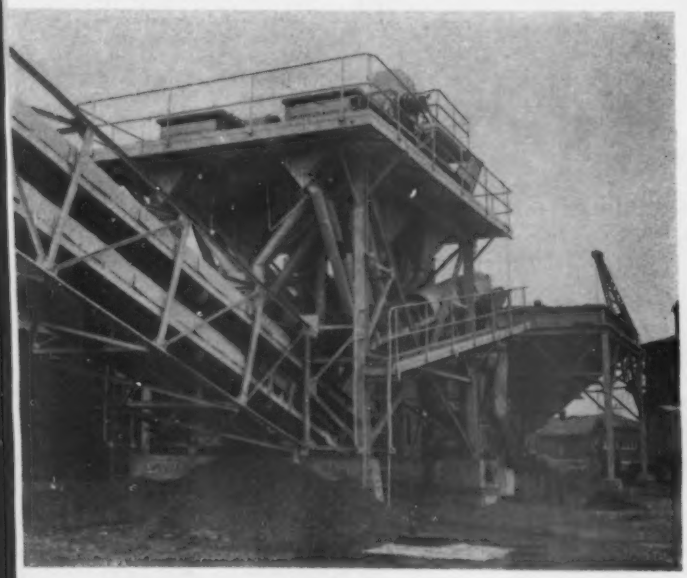


AUTOMATION, blending ability and flexible processing circuits of the new 400-cu. yd. per day plant are in sharp contrast to the old operation it replaces. In normal production, four basic fractions are processed, separately stockpiled, and subsequently blended under close control to desired specifications.

BOTH THE LIGHTWEIGHT AGGREGATE OPERATION and the brick plant, which are on the same property, are supplied with shale from this pit. Feed to the former is comprised, after initial reduction, of 1½- by ½-in. material.



A CLOSEUP of the primary and secondary reduction phases of the new plant. The primary single roll crusher is at the left, and one of the two double-roll secondary units is at the right center. (The other is behind the short bucket elevator.)



Left:
SCREENING is done with a pair of 4- by 20-ft. double-deck horizontal screens, top. From each screen, individual finished fractions flow through closed chutes to the appropriate one of the four conveyors, left.

on a design by the operating staff and engineers of Dominion Tar & Chemical Co. Ltd. (parent company of Cooksville-Laprairie), the project included a third rotary kiln and a completely new processing flow from raw clinker to finished product loadout.

The new plant provides a striking contrast to its predecessor, in which there was provision for only a single-pass flow; provision for blending was also limited; and there was a minimum of automation. In the new operation, screening and secondary reduction circuits permit recycling of any desired proportion of any product; finished product reclaiming and handling systems provide great flexibility in blending; and the automated interlocked sequences throughout are efficiently controlled from two points—one handling the flow up to and on the stockpiles, and the other from stockpile to loadout.

Capacity of the expanded operation is now rated at 400 cu. yd. per day, compared with the 240-cu. yd. rating of the original installation. In normal production, four basic fractions are processed and separately stored, with the maximum size ¾ in. The basic fractions are blended under close control to desired specifications.

Both the Haydite operation and the firm's brick plant, located on the same property, are supplied from the same pit. The latter is owned by the company, but operations are carried out under contract. As received at the plant, the Lorraine shale in this pit exposure has the following average analysis:

SiO_2	57%
Al_2O	17
Fe_2O_3	7
CaO	4
MgO	3
K_2O, Na_2O	3
TiO_2	1

Raw shale is hauled by truck from the pit to a primary crushing installation which serves both the brick and the Haydite operations. Products of this reduction are passed over a double-deck Telsmith Vibro-King on which 1½- by ½-in. material is removed for feed to the expanding operation. The remaining material from the screen is delivered to the brick plant.

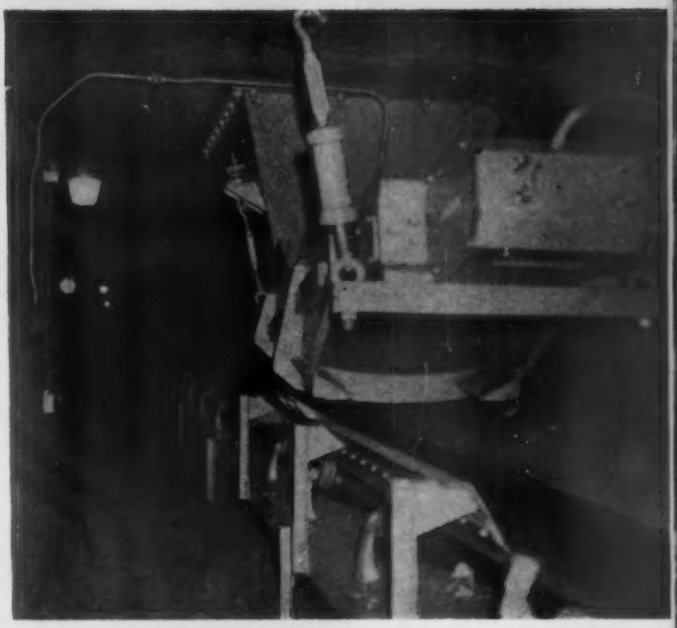
Initially sized raw shale is conveyed to a distributing belt above an 1,100-cu. yd. capacity storage bin in the kiln building. From this bin, flow is initiated to three parallel processing lines by a group of three Link-Belt feeders. Following the feeder in each line is a bucket elevator that delivers shale directly to the respective kiln.

Prior to the enlargement of the kiln department, this phase consisted of two 6- by 50-ft. kilns supplied by their individual open-type bucket elevator. When the newest kiln (a 7- by 60-ft. unit) was added, a closed Stephens-Adamson elevator was installed to handle its feed.

All three kilns are gas-fired. In past operation of the older units it was found that certain modifications resulted in greater kiln efficiency. This involves "stealing" air from the hoods for preheated primary combustion air—a procedure that accomplished two things. First, there is a saving of the B.t.u. otherwise required for heating combustion air; second, the increased velocity of fuel-air flow gives a longer flame.

The kilns discharge into a common clinker pit from which the material is rehandled by a clamshell crane with a 2½-cu. yd. bucket. From this point on, the clinker is processed entirely in the new crushing, screening, and blending plant. Clinker removed from the pit is placed on a surge pile and subsequently rehandled, as needed, by the same clamshell to fill the 150-cu. yd. plant feed hopper.

From the latter, the clinker is transferred on a 36-in. Link-Belt apron feeder to the primary breaker —a 24 × 36 McLanahan Corporation single-roll crusher. The 3-in. top size product of this reduction is delivered by bucket elevator to the secondary crushing stage. This phase incorporates two 24 × 24 McLanahan double-roll crushers which deliver a 1-in. top size product.



THE RECLAIMING TUNNEL (200 ft. long) below the load-out piles houses a battery of four vibratory feeders. Operation of the latter is in timed sequence for recovery of separate materials to make up specified blends.

EACH TUNNEL BELT FEEDER is fitted with a sensing arm and a limit switch (center, above the material on the feeder) which stop feeder operation if the flow of material is interrupted or the overlying pile is depleted. The action also automatically stops the following units in the loadout belt system.

Secondary crusher discharge is raised in a bucket elevator and delivered to a pair of 4- by 20-ft. horizontal double-deck Link-Belt screens. Mounted side by side in parallel, these units are fitted with identical screencloth on corresponding sections. The first 15 ft. of the top deck on each screen has ⅜-in. opening cloth, and the final 5 ft. has ¾-in. openings. On the bottom deck of each screen the first 15 ft. has 4-mesh cloth, and the final 5 ft., ½-in. screening.

Plus ¾-in. oversize, of which there is only a nominal amount, is returned from the screens by belt conveyor to either one (or both) of the secondary crushers in closing the circuit. A Dings magnetic head pulley is provided for each of the two conveyors delivering the oversize to the crushers, to protect the latter from any tramp iron that may have been carried in the flow.

From each screen, the individual finished product fractions flow through closed chutes to the appropriate one of four 18-in. belt conveyors. The latter are paired in an unusual arrangement that permits using four stockpiling conveyor systems in a straight line. Each pair is arranged with one conveyor above the other for the length of the shorter

(*Concluded on page* 95)

between AMSCO and other hard rock track shoes

There's *more than just a little difference* between Amsco manganese steel hard rock track shoes and other brands. Amsco shoes are built to take the impact and abrasion of the hardest rock.

H. E. Lowdermilk Construction Company, Englewood, Colorado, and Espanola, New Mexico, specializes in rock work where the going is rough and tough. Standard track shoes for one of their HD21's *wore out completely* in as little as 270 hours. Amsco 26″ manganese steel track shoes were specified and 302 hours later wear was only $\frac{3}{16}$″.

Mr. Howard Neff, mechanical superintendent for Lowdermilk, can actually measure the difference between the Amsco shoes and the ones they used to use. You will too. Just ask for Amsco shoes, available for all major makes of crawler tractors and in any special design you need.

Amsco makes a complete line of cast tractor parts, including end bits, replaceable sprocket rims, grouser bars and welding electrodes for buildup, repair and hardfacing.

AMSCO

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILLINOIS

AMERICAN Brake Shoe COMPANY

961

Other plants in:
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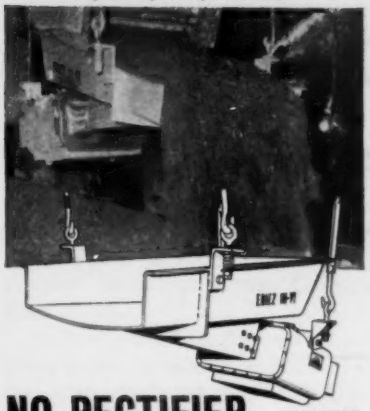
ERIEZ *Magnetic Minute*

60 seconds that will help you improve operating efficiency.



NO RECTIFIER NEEDED WITH ERIEZ HEAVY-DUTY VIBRATORY FEEDERS

PATENTED

AC powered Eriez Hi-Vi vibratory feeders move large tonnages of bulk materials with accurate control . . . more efficiently and economically. Illustration shows one of a number of Eriez units available for heavy feeding applications where **big capacity and accuracy** are essential.

Whatever your application, there is an Eriez electro-permanent magnetic feeder that will meet your exact needs. And you get this exclusive combination of advantages: No rectifier needed . . . AC operation. Totally enclosed drive element ideal for hazardous, dusty, wet and corrosive installations. New fibre glass springs assure superior performance and control . . . longer life because spring breakage is practically eliminated.

The full line of Eriez Hi-Vi vibratory feeders includes models with feeding capacities ranging from ounces to many tons per hour.

Write for descriptive bulletin to:

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MAGNA-THOUGHT

Constant research, development and refinement are the keys to new and improved products. New and improved products are the keys to a company's growth.

A. F. ISRAELSON
Chief Engineer

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

Enter 95-A on card, page 181

Veteran Haydite Operation

(*Concluded from page 93*)

unit in each case, and the two pairs are mounted parallel in one supporting framework. (See accompanying photograph.) The two belts handling the larger fractions are paired, as are also those for the two smaller products; and the systems were built to discharge onto four separate piles in a straight line, with the largest product first and the smallest last.

These stockpiles are not generally utilized for direct shipment loading, and do not have an underlying reclaiming tunnel. The material in the piles noted above is transferred at specific times to a stockpile area nearby which does incorporate a tunnel recovery conveyor system. Transfer of Haydite from one area to the other is handled by a 3-cu. yd. Trojan front-end loader.

The 200-ft. long concrete tunnel below the loadout piles houses a battery of four Jeffrey vibratory feeders. Each of the latter is fitted, as seen in an accompanying photo, with a material-sensing arm and limit switch. If the flow of material is interrupted, or the pile is depleted around the draw point, the limit switch is actuated and the feeder is stopped. This also automatically stops the loadout belt system.

Feeder operation is carried out in timed sequences in loading blends. For any given specification requiring two or more of the finished product fractions, the first appropriate feeder is actuated. This is followed by automatic starting of the next feeder, or feeders, required at preset intervals. Only one minute and 14 seconds are required for material to travel from the most distant feeder in the tunnel to the loadout discharge. The conveying system includes three 30-in. belts—the tunnel unit, a short conveyor emerging from the tunnel, and the final section that supplies the rail- and truck-loading chute.

Control of the feeders and the loadout conveyors is provided on the loadout tower. The rest of the new facilities, *i.e.*, the crushing and screening installation, is controlled from a panel in a masonry structure adjoining the plant. Switchgear is also housed in the latter structure.

ERIEZ *Magnetic Minute*

60 seconds that will help you improve operating efficiency.

PATENTED

How much will an ERIEZ PERMANENT MAGNETIC PULLEY save you?

Erium® powered Eriez magnetic pulleys save one firm $1200 a year by removing 50 pounds of tramp iron a week from coarse clay. They can save you as much—or more, depending on your application.

In addition to preventing machinery damage, Eriez permanent magnetic pulleys prevent fires and explosions; assure product quality.

The pulley illustrated is one of 192 sizes (up to 36" diameter in any belt width) made by Eriez. **There is one for your exact application.** Two basic models are available: **Type AA,** ideal for separating small and medium tramp iron and fine ferrous contamination; **Type CR,** which performs best in removing large pieces of tramp iron.

All models are engineered and constructed to give you the finest in automatic separation. All are powered by Erium®—our exclusively-designed power source. Model for model, Eriez units give you the finest quality and consistency of magnetic strength.

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ERIEZ MANUFACTURING CO.
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ERIEZ OF CANADA LTD.
P.O. Box 5, Sta. W — Toronto, Ont.

MAGNA-THOUGHT

We willingly share our design and application know-how to help our customers find new ways to improve their plant efficiency and product quality.

E. J. TENPAS
Supervisor,
Magnetic Engineering

ERIEZ

A GROWTH COMPANY . . .
10 NEW PRODUCTS IN THE LAST 5 YEARS

Enter 95-B on card, page 181

A POINT OF INTEREST in the laboratory tour was the lightweight concrete test area. The men are examining samples of lightweight aggregate. At the left is a testing unit for determination of creep in a test cylinder.

By BUREN C. HEROD

N.L.A. Operators Check Industry's Methods

Comprehensive sessions aimed at steady improvement in production, product quality

ANOTHER ON THE SPOT REPORT

OPERATORS are constantly seeking methods of making more and better lime at a lower cost. This observation by M. A. Rikard (Southern Cement Co.), vice-president of the National Lime Association, in his opening remarks at the recent annual N.L.A. operators' meeting was in effect the theme of the outstanding program that was held October 5 and 6 at the Shoreham Hotel, Washington, D. C.

Attending this latest of the yearly operating meetings, consistently impressive for the caliber of material presented, were more than 100 men representing virtually all major U. S. operations, plus a number of Canadian and English producers.

In addition to papers presented by several widely known production men on approaches to specific problems within their respective facilities, the program included presentations by a number of engineers and industry specialists on development of new equipment and methods.

Another highlight was the annual presentation of safety awards recognizing the safety records of the operating forces.

For this meeting, an interesting departure was made from the usual practice of visiting a lime plant in the vicinity of the meeting locale. A tour was made of various laboratories in the National Bureau of Standards, and the operators were given the opportunity to see a number of test procedures and research projects involving lime and other materials.

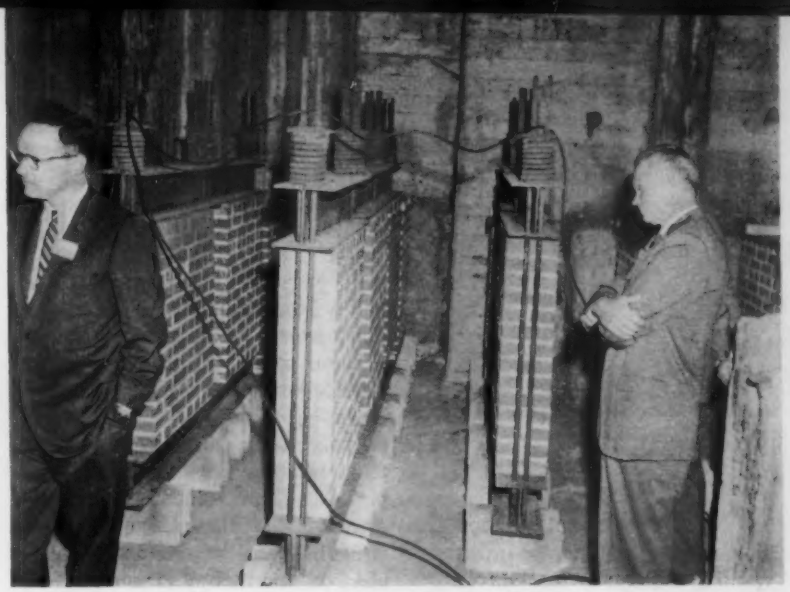
The success of the meeting and credit for arranging the highly interesting program are due largely to three men and the effort they expended in organizing the many details—A. M. (Tony) Caito, of Basic Incorporated; W. A. Roberson, Chemstone Corporation; and R. S. Boynton, general manager, N.L.A. Mr. Caito, Mr. Roberson, and George Zeigler (M. J. Grove Lime Co.) were presiding officers of the three discussion sessions.

Bureau of Standards Tour During the conducted tour through the building materials section of the industrial division of the Bureau of Standards, the group visited a number of testing laboratories. These included areas where checks were run on Blaine fineness (air permeability), cement soundness, performance of lime mortars, creep of lightweight concrete, and durability of asphalts. Demonstrations were also given of new electron microscopy and X-ray diffraction equipment.

The point of possibly greatest interest to the visitors was the lab where performance of lime mortars in masonry walls under various load conditions was being investigated. Although the operators to a man were impressed with the wide range of activities of this government agency, it was apparently the reaction of most that on lime research only the surface has been scratched, and that much work remains to be done.

German Cost Lime Survey Possibly the first lime cost survey of any consequence ever undertaken anywhere was described by Mr. Boynton. Conducted by the German lime association, the survey was aimed at establishing comparisons on total costs of participating firms, as well as individual cost segments.

Although the historic reticence of lime producers to participate in such a survey was apparent in the fact that about 30 percent or less of the



ONE OF THE MOST INTERESTING ACTIVITIES in the laboratory tour from the standpoint of the N.L.A. operators was this testing of lime mortars under varied load and no-load conditions.

association's membership took part, it was nevertheless considered a significant step forward, and fortunately the companies co-operating included some of the largest and most important members of the German lime industry.

As background for the cost ranges given below, it should be noted that fuel costs are much higher in Germany, and this makes fuel efficiency the primary objective; quicklime quality is lower due to generally poorer grades of limestones, which are frequently contaminated by clay or shale seams (involving appreciable cost for washing, screening, or scalping); and wages are lower. However, the latter have risen by 15 percent in the last year alone, Mr. Boynton noted, reflecting increasing pressure by labor.

In the following cost elements reported by Mr. Boynton, the costs are based on deutsche marks/long ton—one dm equal to $.25. The survey showed these ranges for total cost within a given cost center:

drilling and blasting—
from .27 to 1.14 dm
quarry loading—.20 to 1.74 dm
haulage to crusher—
.24 to 1.35 dm
crushing, screening, washing—
.17 to 2.23 dm
calcination costs—
12.07 to 41.36 dm

The total cost of lime manufacturing was reported to range from 14.72 to 45.70 dm/long ton. (This includes stone extraction.) Materials and power together represented the largest average cost, or about 28 percent of the total. Interestingly enough, sales costs—at an average of 16 percent—were second, and were followed by labor costs that were about 15 percent of the total.

Trace Elements Although much has been accomplished in the study of limestones and lime, investigations of trace elements are really only getting under way, according to M. F. Goudge, consulting engineering geologist, Ottawa, Canada, who discussed the *Significance of Trace Elements in Limestone and Lime*.

This is primarily due to the difficulty of making quantitative determinations—as amply evidenced in the usual chemical analyses of limes and limestones. Further, a trace of virtually every element in the periodic table may be present.

Among the primary trace elements noted are boron, manganese, cobalt, zinc, molybdenum, and copper. Most of these have considerable beneficial potential, particularly in agriculture. However, Mr. Goudge stated, too much can be as bad as too little. Limestones rarely have an excess, it was said.

At present, trace elements in metallurgical and chemical limes are a nuisance. In the future perhaps, the speaker said, effective utilization may be found for such elements in the above fields. Even now they have been useful in stone utilized in magnesium processes.

Trace elements, it was emphasized, have an important bearing on the use to which lime and limestone is put, and also on their processing. This underlines the importance of chemical and spectrographic analysis when a limestone deposit is opened for production of lime. Get good samples, and plenty of them, Mr. Goudge urged.

Grate Discharge Mechanism Although oil shale retorts may seem far removed from lime manufacture, an interesting report on equipment and methods applicable to both was made by J. H. Carpenter (Cameron and Jones, engineers and consultants, Denver, Colo.), who co-authored with J. B. Jones Jr. a paper on *An Improved Large-Diameter Grate Discharge Mechanism for Shaft Kilns*.

Many of the features desirable in a vertical lime kiln are equally desirable for an oil shale retort, according to Mr. Carpenter; they include thermal efficiency, flexibility in feed sizes, minimum degradation of the solids products, and provisions for a wide range of retention time through the proper discharge arrangement.

Essentially, experimental work carried out in Mr. Carpenter's firm was aimed at development of an oil shale retort—or kiln—in which mixed feed could be uniformly distributed over the full area of the kiln, in which uniform heat could be established in all areas, and which would include a discharge mechanism that would provide uniform solids flow with consequent uniform gas flow upward through the bed of solids being processed.

A search for such a discharge mechanism was not fruitful, and the firm's engineers designed one which has been built and tested; a patent is pending on the device. It was developed to serve a 36-ft. diameter kiln for a Brazilian oil shale operation.

The unit, as viewed from the top inside the kiln, is comprised of a center cone surrounded by an annular opening, then an annular in-

AWARD WINNER. Dr. Rune Hedin, manager, chemical department, Swedish Cement and Concrete Research Institute, Royal Institute of Technology, Stockholm, is the second recipient of the annual $1,000 Azbe Lime Award. Dr. Hedin's prize-winning paper was announced during the meeting.

verted V, another annular opening, and then half of an annular inverted V forming a slope to the kiln wall. Slopes of the cone, and the sides of the V's are about 30 deg.

Below the annular discharge openings, which total exactly one-third of the kiln's cross-sectional area, are retarder plates. Gases enter through the annular openings. Between both the inner and outer retarder plates and the corresponding annular opening above are pusher bars. These bars are hydraulically actuated through ten steel pipes linking the bars to ten hydraulic cylinders around the outside of the kiln.

The two pusher bars plus their ten actuating pipe sections make up the horizontally moving section of the discharge grate. Material is moved by the pusher bars across the retarder plates to the openings between the latter, and then falls to an underlying receiving area.

Photos and movies of the original design installation, as shown by Mr. Carpenter, illustrated the consistently horizontal level of the bed during draw, and the uniformity of downward solids flow throughout the cross section of the unit.

Lime Research Award A feature of the meeting was the announcement of the winner of the $1,000 Azbe Lime Award. Dr. Rune Hedin, manager of the chemical department, Swedish Cement and Concrete Research Institute, Royal Institute of Technology, Stockholm, is the second recipient of the award, which is made annually. A check is presented under the terms of the award to the writer of the best technical paper on lime manufacture, or basic research on lime properties.

Dr. Hedin's paper on *Investigation of the Lime Burning Processes* explains causes of variations in the physical structure of calcium oxide. In his research work, pure calcite crystals were calcined at varying temperatures, pressures, and time periods. Then volume change, degree of dissociation, and surface structure were determined through electron microscopy. The effects on volume and structure of post-heating to a higher temperature were also investigated.

Safety Awards Recognition of the 19 lime plants which were operated throughout 1960 without a disabling work injury, and were thus winners in the annual safety competition conducted by the Bureau of Mines, was made with the presentation of the association's Certificates of Achievement in Safety. (See complete list on page 86, PIT AND QUARRY, July, 1961.)

In addition to the certificates, the top operation in each of the four categories was presented with the *Rock Products* trophies.

Two of the association's special awards were also won by the Ludington plant of the Dow Chemical Company and the New Braunfels operation of U. S. Gypsum Company. A 3,000-day certificate was presented to the men of the Ludington plant, which they have operated for that many consecutive injury-free days. The plant had also received 1,000- and 2,000-day awards previously. At New Braunfels the crew has reached a 1,000-day record, and received a certificate honoring that performance. This is the second such award earned in that operation.

Safety Analysis In the first such analysis since the annual Bureau of Mines safety competition was initiated in 1935, a study of trends during the last quarter-century was made and described by Kenneth Gutschick, manager technical services, N.L.A.

Under the heading of *A 25-Year Study of Lime Plant Injuries Pinpointing Principal Hazards*, the investigation developed some interesting statistics on disabling work injuries.

In that period, the study shows, the industry has made considerable progress—the frequency rate generally declining (except for a record high in 1943) to the lowest point (1958) of 12.58 injuries per million man-hours. The record for the last two years is quite close, but slightly higher than the 1958 figure. Severity rate statistics are comparable—reaching a high during 1940, and then generally declining to 728 days lost per million man-hours in 1958.

Of particular interest in Mr. Gutschick's analysis is the breakdown of injury causes. During the last 25 years falls of persons, burns, and handling materials (other than rock) have consistently topped the list of injury causes. In total, they rank in the above order, and together have accounted for more than 40 percent of all injuries.

The analysis has developed some significant clues as to where lime operators can concentrate effort toward circumventing injuries. It also underlines the fact that while the record has shown general improvement, there is ample room for further gain.

Recent Kiln Innovations As on many occasions in the past, Victor J. Azbe (Azbe Engineering Corp.) made a number of interesting observations on kiln design projects with which he has been concerned.

Concentrating primarily on combustion problems, Mr. Azbe used a series of slides to illustrate some new designs in firing burners. Among these were so-called preheating, cracking, and reforming chambers —in effect, gas producers—to handle natural gas in one instance, and oil in another.

The objective in these designs is to expedite distribution of gases for combustion, hence the "cracking" of oil fuels and their volatilization in the gas-producing burner chamber.

A gas analyzer should be used for all combustibles in natural gas, Mr.

Azbe emphasized, so that methane, for one thing, can be checked in the exhaust gases. As further illustration of his concern with efficient utilization of fuel, he pointed out that a 25 percent waste of fuel is equivalent to a 50 percent loss in production.

Silo Storage Systems "Quicklime has an inherent affinity for water and carbon dioxide. The storage of quicklime thus becomes one of the most vital steps in the production and marketing of a high quality quicklime."

The above fundamental point was made by Cecil Koger (Southern Cement Company) in a description of lime storage installations at this firm's Roberta, Ala., plant. Originally provided with two steel tanks, the storage setup (including interstices) would accommodate 2,500 tons of pebble lime.

Subsequent additions to production equipment made it necessary to install three more tanks (850 tons total capacity), which are normally used as intermediate loading tanks. Still another increase in pebble lime production was followed by the erection of four reinforced concrete silos that provided 5,000 tons more of storage capacity. Altogether, the Roberta installation can handle 8,300 tons of pebble lime, including production from shaft kilns at a different location.

As produced at Roberta, lime is transferred by drag conveyor and elevator to a triple-deck screen. The four fractions from the screen are normally transferred to the steel tanks for loading, or for limited storage. If business is slow, the lime may be carried directly to the concrete silos for storage. It is possible, however, to place a combination of the screen fractions in either the tanks or the silos. Lime is reclaimed from the silos by vibrating feeders set for 100 t.p.h., and can be drawn from any one of the silos or interstices, or from all points simultaneously. It is then transferred to a double-deck screen from which the fractions are transferred to the loading tanks and mixed with comparable sizes from the screen handling the kiln discharge.

Quicklime in this plant is relatively hard, Mr. Koger noted, and degradation in the above handling is not excessive. Fines are not a serious problem since they are used in the hydrate plant. Normally, it was pointed out, pebble lime does not remain in storage longer than 60 days. Laboratory analysis of material stored in the concrete silos for that length of time showed the following:

size	pebble lime 1½ x ⅜	fines 3/16
CaO	97.24%	96.30%
loss on ign.	0.83%	1.04%
total temp. rise	37 deg. C	38.5 deg. C

The above results showed that lime could be stored for 60 days with less than 0.5 percent decrease in available CaO. Since the stored lime is put back into the intermediate loading tanks along with fresh lime from the kilns, the decrease in availability becomes negligible.

Complicating the storage problem for Austin White Lime Co., Austin, Tex., as noted by John Tyler, is the fact that road stabilization is a substantial market. Since roads can only be built or stabilized in good weather, lime plant storage must meet a wide range of periodic demand.

To accommodate such fluctuation, two steel tanks of 1,100-ton total capacity were erected. These are filled with hydrate by bucket elevator, and recovery is made with company-fabricated star feeders that regulate the flow of material from the tanks into underlying trucks. Steel was selected over concrete in the construction of the tanks since it is more amenable to induced vibration, to eliminate a hangup of the material in storage.

Inclined Drilling Bringing the operators up to date on the interesting subject of inclined drilling that he first described to the group during the Philadelphia meeting, Dr. B. J. Kochanowsky, College of Mineral Industries, Pennsylvania State University, noted the growing application of that drilling method.

Using slides and models to illustrate his points, Dr. Kochanowsky cited a number of advantages inherent in the method. They include safety, elimination of toe problems, better fragmentation, elimination of back break, less drilling footage required per ton of rock (or less explosive consumption because larger burden and/or spacing are possible), smaller borehole diameters, and less blasting vibration.

In drawing a comparison between missiles and quarry blasts, the speaker pointed out that the former utilizes 100 percent of the shock wave energy produced, but the latter utilizes only 5 to 10 percent. Inclined drill holes, he emphasized, reduce resistance of rock to blasting and make the most effective use of released energy. (*Turn page*)

M. F. Goudge . . . At present, trace elements in metallurgical and chemical limes are (often) a nuisance, but in the future, utilization may be found.

J. H. Carpenter . . . Many of the features desirable in a vertical lime kiln are equally desirable in an oil shale retort. His firm developed a unique grate discharge mechanism.

V. J. Azbe . . . A 25 percent waste of fuel is equal to a 50 percent loss in production. (Mr. Azbe is the donor of the generous annual award mentioned in this report.)

Cecil Koger . . . Quicklime has an inherent affinity for water and carbon dioxide, and its storage is a vital (factor) in production and marketing.

Dr. B. J. Kochanowsky . . . A missile utilizes 100 percent of the shock wave energy produced (in blast-off) — but a quarry blast utilizes only 5 to 10 percent.

Edward Tanski . . . Kiln efficiency depends on such factors as fuel efficiency, refractory life, operating labor, maintenance and supply costs, and down time required.

R. H. Lepley . . . Variations in stone within a formation (can) pose substantial problems in attaining uniform product quality.

Dr. C. M. Patterson . . . Bureau of Mines canvasses of open-market and captive lime production cover at least 90 percent of the production in the United States.

Kiln Efficiencies One of the most comprehensive reports on calcining operations ever presented at the operating meetings was given by Edward Tanski, plant manager, Mercer Lime Company, Branchton, Pa.

Usually, when speaking of kiln efficiencies, most people think in terms of fuel ratio, Mr. Tanski pointed out. Although the latter is one of the most important factors in lime production, he prefers to regard kiln efficiencies as those factors which contribute to the maximum production of the best quality of lime at the least possible cost. Primarily, it was noted, they would include fuel efficiency, refractory life, operating labor, maintenance and supply costs, and down time.

Fuel efficiency, up to a point, is usually the easiest to correct, Mr. Tanski said. However, the equipment installed to achieve that goal is sometimes so maintenance-prone that savings gained in fuel efficiency are lost in the operation of auxiliary equipment. Vertical kilns, as a whole, have much better fuel efficiency than rotary units; and since they are practically maintenance-free, they do not ordinarily have any down time except for occasional relining. Therefore, any installation of equipment to improve the fuel efficiency of a vertical kiln should be scheduled with relining periods so that down time and related costs do not offset fuel savings.

Mr. Tanski enumerated from his experience the factors that must be present for maximum fuel efficiency in a vertical kiln. These include correctly sized stone, availability of adequate draft, proper preheating of stone, proper mixing of combustible gases and air, adequate volume and pressure for the introduction of the gases and air into the center burner, effective cooling of lime with reintroduction of the heated cooling air into the kiln, and adequate instrumentation for balanced kiln operation.

BuMines Lime Reporting A review of procedures in the nonmetallic minerals division of the Bureau of Mines which is concerned with lime was given by Dr. C. M. Patterson, commodity specialist in the agency.

Dr. Patterson also commented on some interesting new patents in the lime field which have come to his attention. Among these were a patent covering continuous lime calcination on a traveling sintering band; another covering water-jacketed tunnel beams for vertical kilns, aimed at uniform distribution of temperature in calcining zones (the beams carry fuel mixtures to central burner ports); and a patent on a refractory design for rotary kilns in which a refractory ring formed a soaking area ahead of the calcining zone. (A part of the design was a channel in the ring permitting stone to pass on to the next zone.)

Reference was also made to certain patents relating to hydrating, and included one obtained by the G. & W. H. Corson organization covering a "mono-hydrated" lime.

Raw Material Problems In discussing *Lime Plant Control with Variable Raw Dolomite*, R. H. Lepley, Basic Inc., noted that variation in material poses substantial problems in obtaining uniform product quality.

A number of slides showing formation variations in a quarry face, illustrated the difference in appearance between vesicular and more solid strata of the stone. Since the vesicular material required a lower temperature for calcining than the more dense stone, overburned and underburned material affected uniformity in hydrate products.

This led to an investigation of proper calcining temperatures. In the study, 200-mesh samples were calcined in a special furnace at different temperatures. Each sample was then hydrated in laboratory equipment, and then milled.

It was found that samples from the dense strata had a higher plasticity when calcined at 1,900 deg., and that although the vesicular raw material had less plasticity, it, too, had the highest degree of plasticity after calcination at the above temperature. Apparently the next-best calcining temperature for both was 2,100 deg. (16-hour calcination).

Similar tests were then run on production lime samples. The latter actually turned out to have higher plasticities than the laboratory samples.

This work led to a new procedure in the quarry. Two types of blasting can be carried out—involving mixing and separating shots. In the latter, holes are loaded in such a way that stone from a certain layer on the face will be moved out farther in the blast than that from a separate layer. The shovel runner can readily select either of the two types of stone, as desired, in loading haulage trucks for plant feed. Improved plasticity and uniform product quality have resulted.

Enter 101 on card, page 181 ➔

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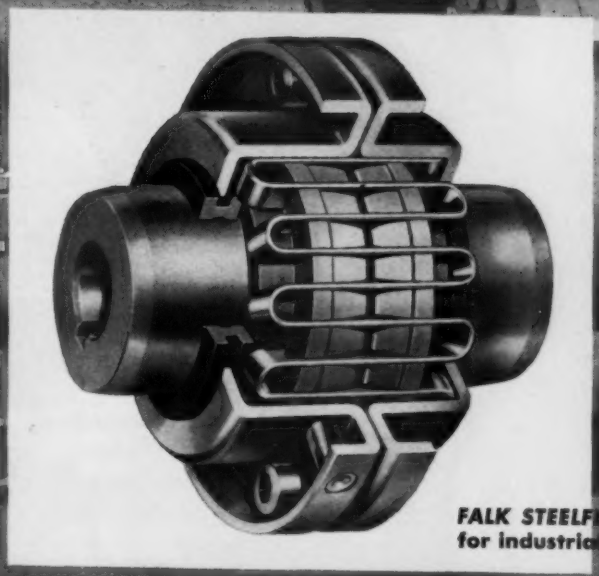

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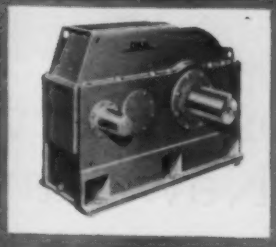

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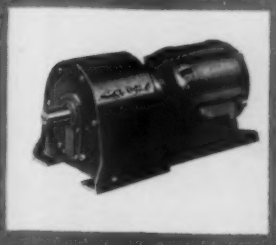

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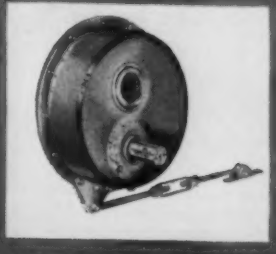

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Company cites excellent instrument performance and engineering service at Riverside Cement as reasons

"We practically 'carbon-copied' the control system at our Riverside Cement plant in California and installed it in Hawaii," reports Mr. Howard R. Starke, Executive Vice President, Hawaiian Cement Corp. Mr. Starke serves in managerial capacity for both organizations.

"Our excellent operating experience at Riverside with Foxboro instruments and Foxboro engineering service made this decision practically automatic."

Located on Barber's Point, Oahu, the new Hawaiian Cement Plant has all process variables — including pressures, temperatures, motion, differential pressures, motor speeds, gas-analysis, and gas-air ratios — under Foxboro control.

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150-T.P.H. Pumice Plant Opened Near Santa Fe

By HARRY F. UTLEY

ANOTHER ON THE SPOT report

PUMICE, a natural aggregate of volcanic origin, was one of the earliest lightweight materials to be used in concrete. Because it varies greatly in occurrence, its use has been somewhat limited in recent years to those areas where it is still regarded as one of the best lightweights.

Northern New Mexico pumice ranks among the best in the country, and many concrete block producers in the Southwest rely on it for their lightweight aggregate needs. Because this material possesses so many good qualities, manufactured aggregates have made practically no inroads in this region.

The Copar Pumice Company of Espanola, N. M., about 16 miles north of Santa Fe, recently erected a new 150-t.p.h. processing plant to crush and classify a high-grade, nearly pure white pumice. The product is shipped to users as far away as 250 miles from the plant.

The Copar deposit is overlain by about 3 ft. of burden. After removal of this material the pumice is dozed out for delivery to the plant, a few miles distant. Hobbs cable-controlled end-dump trailers which carry about 30 cu. yd. are used between pit and plant.

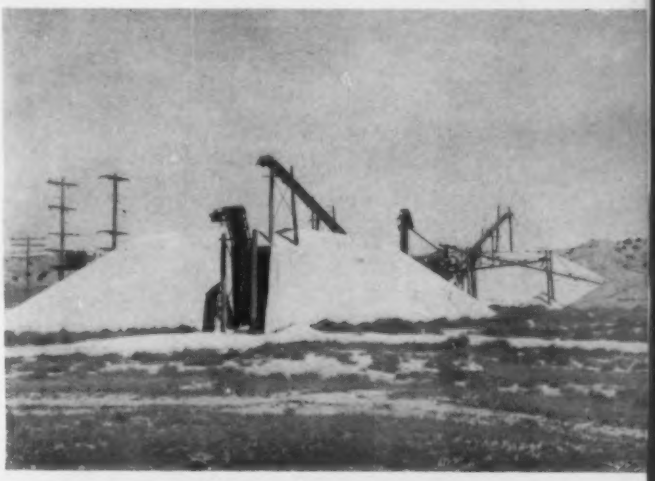
A 20-in. by 120-ft. belt conveyor coming from below the receiving hopper at the plant builds up a 1,000-cu. yd. live storage capacity surge pile. Another conveyor in a tunnel beneath the surge pile supplies the material to the plant for processing. The initial pass and primary separating unit is a 4- by 8-ft. Kolman triple-deck screen. This unit makes most of the finished product in two classifications—minus $\frac{5}{16}$ plus $\frac{1}{8}$ in. and minus $\frac{1}{8}$ in.—the two sizes being stacked by conveyors into two storage piles.

Oversize scalped off the top deck (and the $\frac{9}{32}$-in. mesh on the middle deck if more fines are desired) is chuted to a pair of 14- by 27-in. Denver smooth rolls for reduction. These rolls, turning at 185 r.p.m., are driven by a 40-hp. Allis-Chalmers motor.

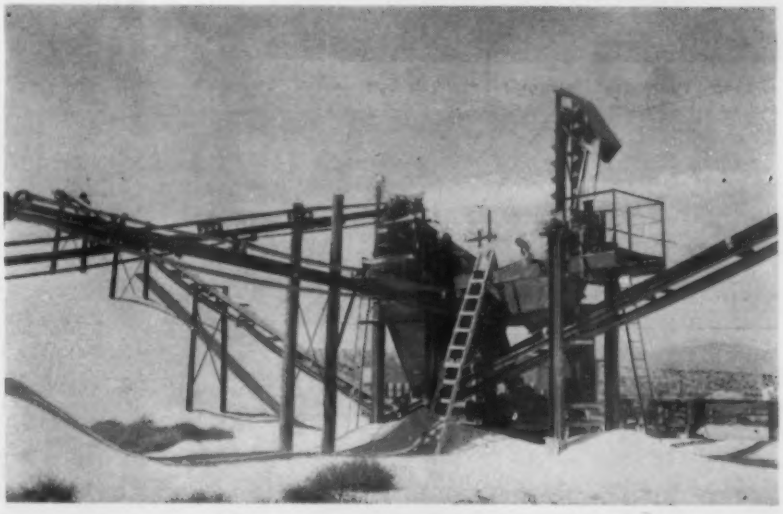
The crushed product is lifted by a 32-ft. high bucket elevator to a 3- by 8-ft. Kolman single-deck screen equipped with $\frac{5}{16}$- by $\frac{1}{8}$-in. slotted mesh. This screen serves primarily as a cleaning unit to remove fines which tend to cling to the larger particles after crushing. Oversize is recirculated and returned to the triple-deck screen by a 20-in. by 36-ft. belt conveyor; the throughs are delivered to the fines storage pile. A common belt conveyor serves both screens in transporting the minus $\frac{1}{8}$-in. fines (throughs) to stockpile.

A 48-in. diameter 2-deck Sweco circular screen has been purchased for future installation to process a

(*Concluded on page* 123)



This view at the Copar Pumice Company plant shows the two piles of sized pumice aggregates. The crusher and screens are between them.



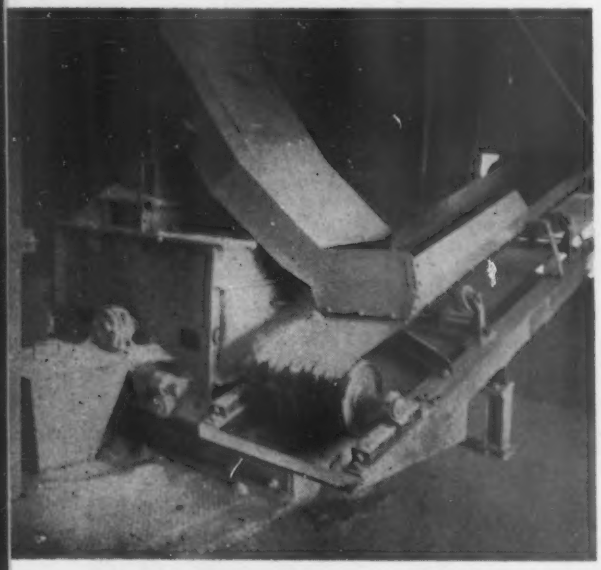
Both of the screens and the crusher are grouped together. The conveyor at the right carries the minus $\frac{1}{8}$-in. finished product to the stockpile, accepting fines that pass both screens. The coarse-material stockpile is to the left.

← Enter 102 on card, page 181

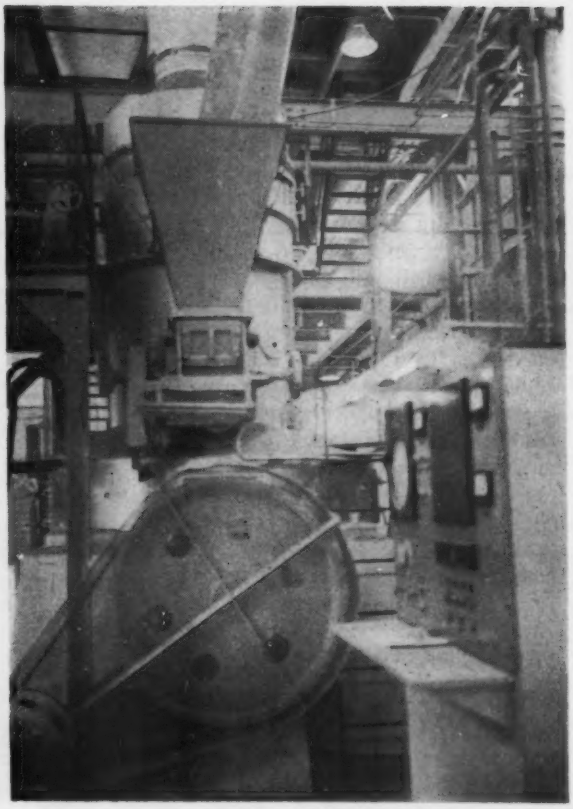
Western Gypsum's New Vancouver Plant Sparkles with Cleanliness

General view of the new Western Gypsum Products plant located on the Vancouver, B. C., waterfront. The board plant and the warehouse building are at the left, behind the company sign. The mill building is at the right, in the background.

By HARRY F. UTLEY



Ore, which arrives at Vancouver by rail, is first crushed to minus ¾ in. by this impactor mill.



Inside the mill building. The mill in the foreground grinds the raw gypsum to a fineness of 90 percent through 100-mesh, preparatory to calcining.

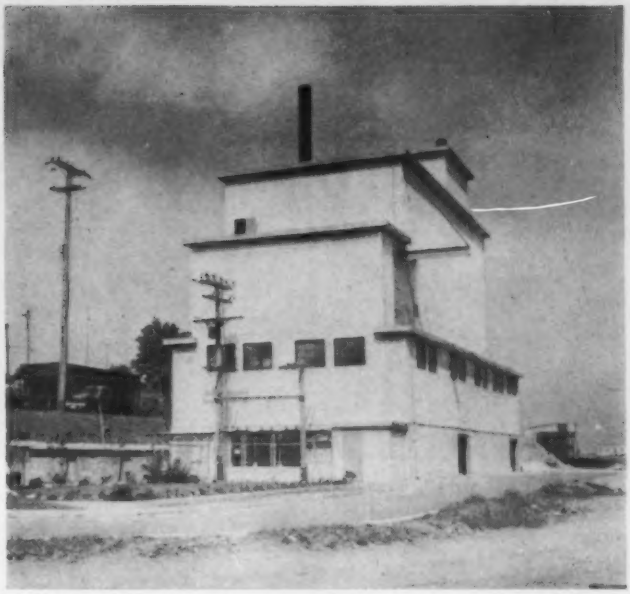
Electronic precipitators, automatic kettle attract attention

WHEN, IN 1960, Western Gypsum Products, Ltd., extended its production and marketing areas westward from the Prairie Provinces into British Columbia, it came up with one of the most impressive plaster and board plants on the North American Continent.

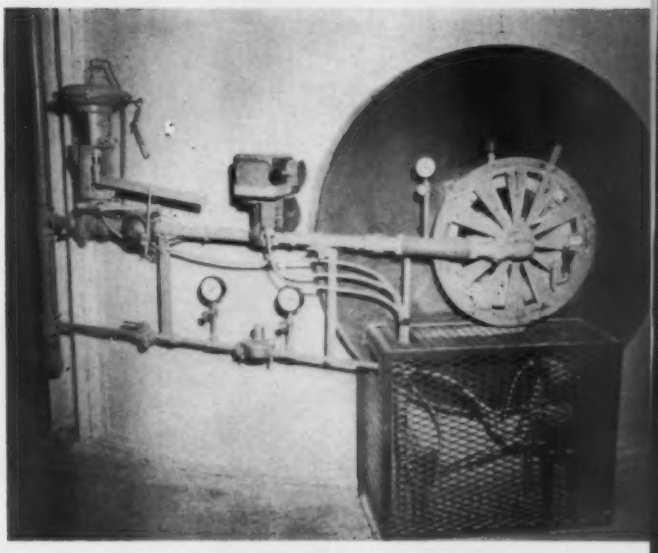
The new operation on the Vancouver, B. C., waterfront represents an investment of about $2,500,000. Two features of the plant are particularly noteworthy: (1) use of a company-designed natural-gas-fired calcining kettle equipped with automatic timing and heat-control devices, and (2) an electrostatic precipitator which enables the plant to operate under practically 100 percent dust-free conditions. By trapping all dust and enforcing a rigid program of good housekeeping, the staff has a plant that is extremely clean inside and out—impressively so to one who has visited most gypsum products operations in the Far West.

Another angle of interest is the erection of separate buildings for milling-calcining, and for board production plus warehousing. The structures are tied together by a 125-ft. tunnel housing a conveyor for the transfer of stucco from the mill to the board department.

Western Gypsum Products was founded in 1929 in Winnipeg. In 1930 a mine was opened at Amaranth, Manitoba, and a plaster and board plant in Winnipeg. In 1945, a second plaster and board plant was built in Calgary. In 1954 the company was acquired by British Plaster Board (Holdings) Ltd. Since that time the Calgary plaster

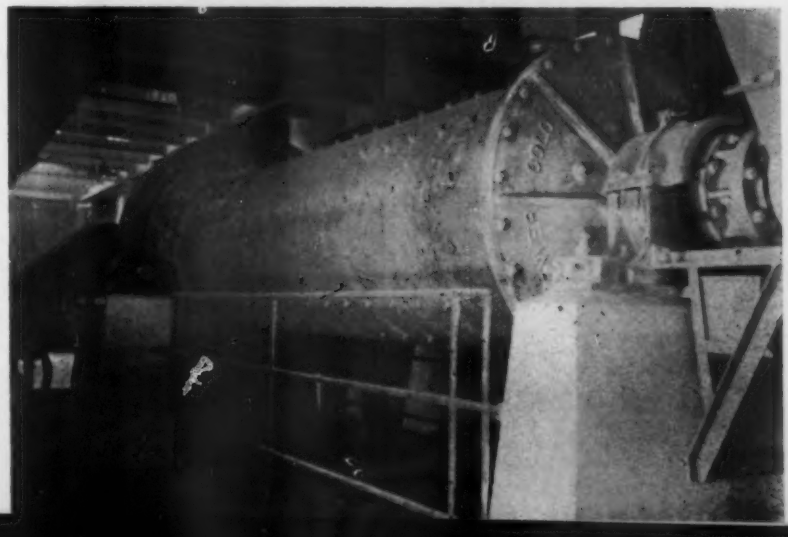


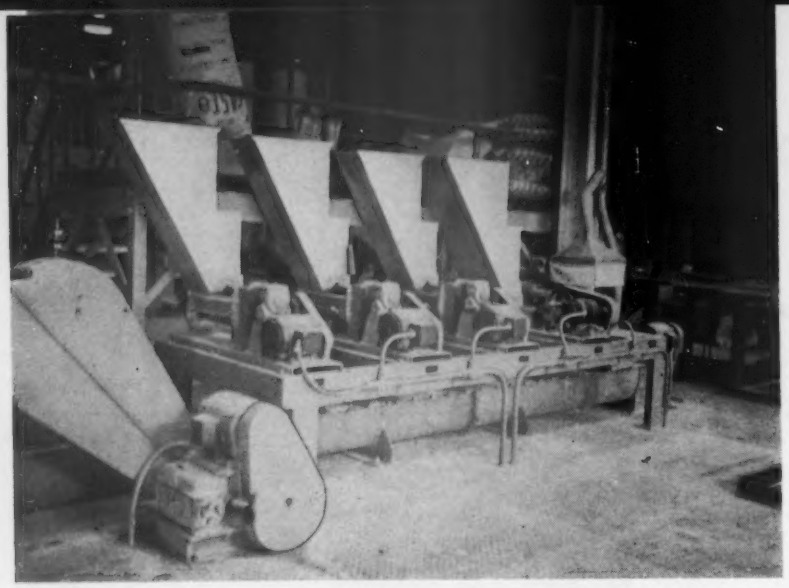
Above:
This view of the mill building reflects the general air of cleanliness which characterizes the entire operation.



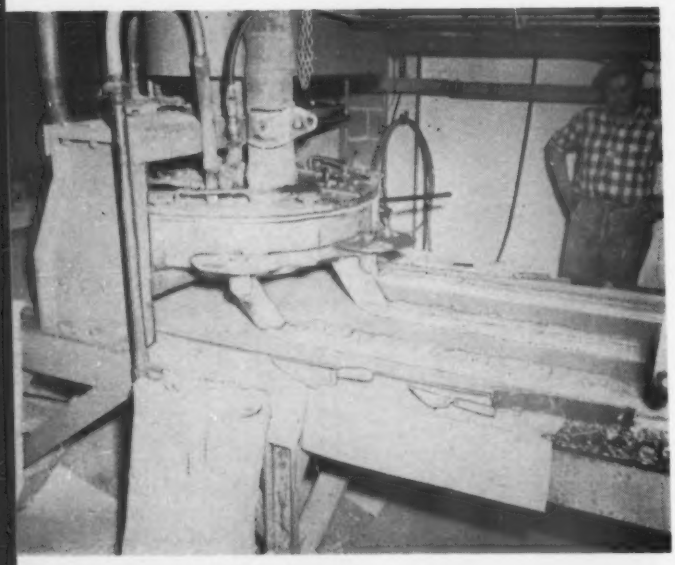
Right:
Automatic burner and control devices on the 15-ton calcining kettle. It was designed and built to company specifications.

The 6- by 20-ft. tube mill which agglomerates the stucco after calcining.





These four proportioners introduce measured amounts of starch and other additives into the board (core) mixture.



Left:
A pin-type mixer lays the wet core mix, spreading it uniformly through three spouts onto the backing paper at the head of the board machine.

Below:
A view down the 57-in. by 300-ft. belt which carries the continuous 48-in. wide board to the accelerated roll section at the far end. The board sets en-route. The dryer is at the right.

mill has been completely revamped, and Calgary board production capacity has been increased 150 percent. Likewise, the capacity of the Winnipeg plant was substantially increased; and an entirely new and modern plaster mill replaced the old Winnipeg facility.

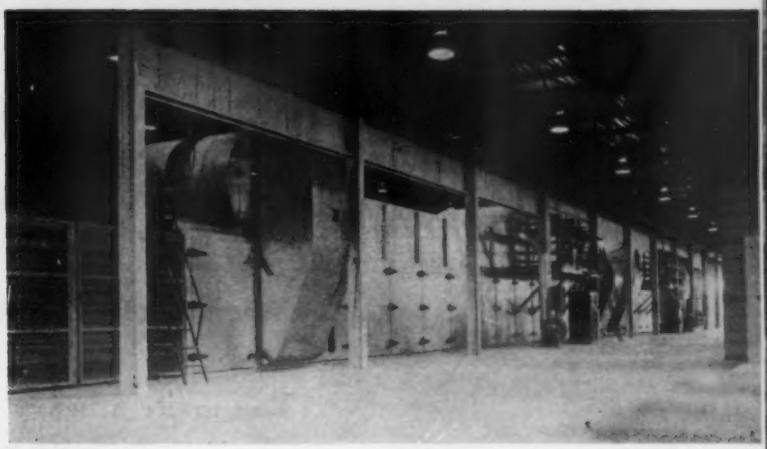
In 1957 the concern purchased the assets of the Columbia Gypsum Company (Spokane), which included high-grade gypsum reserves in the Windermere area of British Columbia. Availability of the Windermere deposit thus opened up an economic source of supply for a plant in Vancouver. The site for the new plant, 11 acres on Burrard Inlet, was acquired shortly thereafter, and the Vancouver plant was built and dedicated on April 22, 1960.

Raw gypsum is crushed to minus 4 in. at Windermere and shipped by rail to the Vancouver plant. The gondola cars discharge to a collecting hopper under a spur track alongside the 100- by 141-ft. mill building, and the rock is conveyed to a Pennsylvania reversible impactor mill for reduction to minus ¾ in. This product is elevated to a 150-ton bin from which a rotary feeder carries it to a Raymond mill. Here it is pulverized to a fineness of 90 percent through 100-mesh at the rate of 12 t.p.h. Now ready for calcining, the fine material is transferred to a 100-ton feed bin alongside the kettle.

As mentioned previously, the 15-ton capacity kettle is completely automatic in operation. It was built by Dominion Bridge & Iron, Ltd., in Calgary to company specifications. It is loaded by a drag chain feeder which cuts off automatically when the high-level point is reached. Calcining temperature is about 300 deg. F. The gas burner automatically cuts out at around 280 deg., the temperature coasting to calcining level by residual heat gain. The cooking cycle is about 2 hours, under constant temperature control, after which the discharge gates open and in the space of 2½ minutes discharge the calcined gypsum (stucco) into the hot pit. The kettle then fills again automatically and the batch cycle is repeated.

Vapor and dust from the kettle and dust arising from any point within the mill building are drawn up to the electrical precipitator col-

Left:
One of the control boards where instruments regulating the operation of the automatic dryer are centralized.



The 6-deck, 150-ft. long dryer, which is direct-fired with natural gas. Operation is entirely automatic; the drying rate is co-ordinated with the travel speed of the board machine belt.

lector. The precipitator, supplied by Western Precipitator of Canada, Ltd., effectively maintains dust-free conditions within the plant, as well as in the outside atmosphere.

From the hot pit, the stucco is stored in a 100-ton bin which feeds to a 20- by 6-ft. Marcy tube mill directly below. Tube milling is done primarily for stucco destined for plaster, as the action improves its sand-carrying capacity and workability under the plasterer's trowel. Stucco for use in the core of board products, however, is also tube milled, but for a much shorter length of time.

Plaster products, some premixed with expanded perlite and vermiculite, are bagged by a St. Regis 4-spout packer machine. Finishing plaster is made with a pure white gypsum rock which comes from the company's Amaranth deposit; the Windermere rock, while of exceptionally high grade, has the typical gray color characteristic of most raw gypsums.

From the bins in the mill building, a screw conveyor carries the stucco to the board plant through the tunnel which runs below ground under the tracks of the Canadian Pacific Railway. The board production building covers an area 100 ft. by 490 ft. in size.

Stucco (calcined gypsum) normally has a setting, or recrystallization time of 30 to 40 minutes—too fast for troweling in the wall. So retardants of various kinds must be added for wall plasters. Conversely, in the manufacture of gypsum board, the set is too slow for economical board formation, so the producer must accelerate the stucco to set in 3 or 4 minutes. Freshly ground gypsum block is one of the best accelerators; foaming agents are also introduced into the board-core mix to improve its qualities, as are other additives such as starches, paper pulp, glass fiber, etc.

After the proportioning of the stucco and additives, the mixture is quickly mixed and deposited continuously through three spouts onto the 48-in. wide forming section of the company-designed board machine. The 57-in. wide belt is 300 ft. on centers, followed by 80 ft. of roll conveyor sections. This phase of board production is conventional, depending upon the type of board being produced; and the machine is equipped with cut-off knives, an Ehrsam lath punch, a press roll, a cutter, etc.

Paralleling the board machine is the 6-deck Coe dryer, 160 ft. in length and direct-fired with natural gas. The transfer turnover at the end of the board machine, and the entrance to the dryer were designed by company personnel. The dryer is completely automatic in operation, its speed being co-ordinated with the speed of the board-machine belt. As the dried, finished board emerges, it is inspected, faced, bundled, and placed on skids for transfer to Towmotor lift-trucks to the warehouse section of the building, or to cars or trucks for shipment. Currently, an automatic bundling machine is being installed, to follow the dryer.

Board and lath are produced in standard ⅜- and ½-in. thicknesses, as well as the ⅝-in., one-hour fire-coded product. Warehouse storage space can accommodate up to 3,000,000 bd. ft. of product.

Westroc Industries, Ltd., a Vancouver insulations material purveyor of long standing, was purchased by Western Gypsum at about the same time the company arrived at the decision to build the Vancouver plant. For a time Westroc marketed products from the Calgary plant in the Vancouver region until the Vancouver plant was built and put into production.

K. C. French, a 22-year veteran within the Western Gypsum ranks, who supervised the erection of the plant, remains as plant manager. His assistant is B. B. Taylor. Harold Denton is the foreman of the board plant.

About YOUR 1961 INCOME TAX RETURN:

Consider this—

You cannot afford to OVERPAY

and

You invite a heavy penalty if you UNDERPAY!

By HAROLD J. ASHE

PROBABLY the most important single financial act of any non-corporate quarry operator or corporate executive during the year is the preparing of his annual income tax return. He is under legal compulsion to prepare a return that will accurately reflect his income tax obligation.

From his own self-interest, he should be no less concerned to see that he does not pay the government *more* than he should. Treasury Department spokesmen have repeatedly cautioned that they expect the full income tax due—but no more. (This article is deliberately addressed primarily to non-corporate problems on the assumption large corporate ventures are ably counseled.)

Nevertheless, many taxpayers—including quarry owners—who are allergic to paper work pay self-assessed penalties every year, due to oversights in preparing their income tax returns. Even the employment of professional tax counsel is no guarantee there will not be expensive oversights of legitimate savings, particularly in non-business areas. A professionally prepared tax return is no better than the facts supplied to counsel. Some of these facts cannot be determined solely by examining accounting records.

Overpayment of income taxes starts for noncorporate operators at the rate of $20 on each $100 of unreported business or personal deductions and $120 for each exemption not claimed to which a taxpayer is rightfully entitled. The incorrect choice in making any election available to a taxpayer can inflate the tax bill.

Within this limited space, emphasis will be placed on certain alternatives and options which may be available, and certain problems on which there is continuing misunderstanding. Certain Code amendments will also be explained because these changes have not yet been generally noted by taxpayers.

DEPRECIATION CHOICES

If a quarry operator has purchased any new or used equipment during 1961, he may have two or more alternative methods or combination of methods for writing off the cost—straight-line, accelerated, or additional first-year.

Once any given method or combination of methods is elected by a taxpayer, he must continue to use this method. Therefore, he should exercise this choice with care. He should weigh the income tax benefit of each method, both in its immediate effect and its long-range results.

It has been pointed out by critics of the liberalized depreciation formulas that regardless of the method elected, a taxpayer in no event can depreciate more than original cost. This statement is true, but it overlooks two fundamental facts which prompted Congress to enlarge the choices: (1) the larger immediate income tax saving in the first year or years of ownership which helps to make acquisition easier; and (2) the larger total income tax saving over useful life due to higher bracket rates and larger income tax savings in earlier years. These provisions recognize the fact that, logically, years of higher earnings are those years in which major capital acquisitions take place, and that over the years taxable income fluctuates. Space permitting, this could be demonstrated in dollars and cents.

Therefore a quarry owner should elect the depreciation method which best serves him on the basis of his present individual circumstances and his *future prospects*. If his adjusted gross earnings are not expected to go higher in the future, immediately taking the maximum available depreciation should usually be to his advantage. He gets a maximum income tax saving sooner than otherwise. This saving, in itself, will help lighten the immediate financial burden of his acquisitions.

On the other hand, a younger quarry owner, and one whose business is likely to grow substantially, may be wise if he takes the *minimum* depreciation to which he is entitled. This is so because during the useful life of the assets some of his taxable income will be exposed to a spiraling individual tax rate.

Thus, a larger part of the total depreciation charges will be deducted in years when higher rates prevail, and the total income tax saving on the useful life of the

Among the areas in which a non-corporate operator may find applicable tax reduction are depreciation, bad debts, casualty losses, business entertainment, business meeting expense, medical-dental outlay, sales tax, charitable aid, civil defense, and dependencies.

asset will be larger. The same is true of a corporate business now subject to the 30 percent corporate rate, which in a year or two may have earnings subject to the 52 percent corporate tax.

Additional first-year depreciation may be taken on assets, acquired, new, or used, that have a useful life of six years or more. Twenty percent of cost may be written off in this manner in the year of acquisition. The ceiling cost in any year on such acquisitions must not exceed $10,000—$20,000 on a joint return. (Corporations are limited to $10,000.) This treatment is not available on buildings.

If additional first-year depreciation is taken, normal depreciation for the year or fraction of a year must be calculated by first reducing cost by the additional first year depreciation taken. Salvage value is not taken into account in determining the amount of the additional first-year depreciation.

Accelerated depreciation may be taken by one of two methods: (1) double declining-balance, or (2) sum-of-the-years-digits. The first method involves taking double the amount of depreciation available the first year by the straight-line method. Each successive year, however, the double rate is applied to the then *remaining* unrecovered balance. In using this method, salvage value does not need to be initially deducted from cost in calculating the annual depreciation charge. However, at the end of the useful life the total depreciation taken must not exceed cost, less salvage value.

When the sum-of-the-years-digits method is used, cost must first be reduced by salvage value. Each year the fraction used for recovery changes. The denominator is determined by adding the sum of the years. If, for example, the useful life is five years, the denominator would be 15—*i.e.*, the sum of 1, 2, 3, 4, 5. The numerator of the fraction starts with years of life, dropping by one each year. In this example the numerator the first year would be five, the next year four, and so on.

Both accelerated methods are available only on tangible property which was acquired *new* and which has a useful life of three years or more. If such assets were acquired used, they must be depreciated by the straight-line method.

Accelerated depreciation is now widely used, according to a survey made by the Controllers Institute Research Foundation. In this survey it was found that 75 percent of the companies participating in the survey use accelerated depreciation. Only 23 percent use the straight-line method, and 2 percent were not classified.

Those companies using accelerated depreciation for all purposes do so in the belief that (a) it will more nearly reflect the decrease in earnings power of such facilities, and (b) that the lower depreciation in later life is offset by higher operating costs.

BAD DEBTS

Accounts receivable that have become worthless during the year should be deducted in the 1961 income tax return, that is, assuming that the taxpayer uses the accrual method of accounting and that the worthless accounts receivable have been reported as income either in the year written off or earlier year.

If such bad debts are not written off in the year their worthlessness is determined, they cannot be deducted in a later year. This does not prevent a quarry owner from collecting the accounts in a subsequent year if they again become collectible. However, their worthlessness in the year of deduction must be a determinable fact, as of then, and they must appear to be uncollectible in the future on the basis of the then known facts.

Nonbusiness bad debts, generally, are also deductible in the year worthlessness is established. These, however, must be reported as capital losses. The debt must be a legally enforceable one, although legal action does not need to be taken to establish this fact, if court action would not enforce collection.

Some loans made to relatives may qualify as bad debts; others may not. Often, such loans are made without the expectation of repayment. These are gifts, not bad debts, but cannot be deducted as gifts, because they were made to individuals. To establish deductibility of a bad debt arising from a loan to a relative, the same efforts must be made to effect collection as would be used against any other debtor. If such a loan has been forgiven, it is not a bad debt for tax deduction purposes.

CASUALTY LOSSES

Taxpayers frequently overlook taking casualty losses. A casualty loss may be either business or personal. Determining the amount of the allowable tax deduction is tricky, and if any substantial amount is involved, the determination should be left to experienced tax counsel.

The deductible loss is usually less than that which a taxpayer calculates he has sustained. Cost must be determined by taking into account *adjusted basis* and other factors. Insurance proceeds must also be taken into account, if there were any. The loss can be taken only in the year it was sustained, with the exception of embezzlement and theft losses. These are deducted in the year they are discovered, if this differs from the year sustained.

BUSINESS ENTERTAINMENT

A good many quarry owners may have occasion to incur business entertainment expenses. Perhaps they

occasionally buy gifts for business purposes. However, an increasing number of business taxpayers are using business entertainment as a thinly concealed device by which to create for themselves "tax-free" income. This abuse has become so widespread it is reaching almost the proportions of a national scandal. The new Administration, as well as Congress, has taken cognizance of it. There is even serious talk of eliminating business entertainment as a tax deduction.

Meanwhile, the Internal Revenue Service is becoming more critical of such deductions, demanding proof of the business purpose served, and that deductions are "reasonable" and "necessary." Taxpayers taking such deductions should therefore be prepared to show (a) who was entertained, (b) the amount expended, and (c) the business purpose served. Entertaining done for the purpose of repaying social obligations is not an allowable business expense, although some (or all) of the guests may be customers or may be in a position to help the taxpayer materially.

The abuse . . . of business entertainment expense . . . has led to serious consideration of its elimination as a tax deduction. The Internal Revenue Service is becoming more critical of such deductions . . . demanding proof that they are "reasonable" and "necessary".

CONVENTION OUTLAYS

The direct cost of attending a trade convention is a deductible business expense. This, however, does not include many incidental expenses of a personal nature, such as nightclubbing outlays or sightseeing events. Usually, a wife's expenses in attending a convention are not deductible. To make such a deduction for her expenses, it is necessary to show that a business purpose has been served. Companionship and socializing do not meet this test. Likewise, the cost of a vacation (combined with a convention trip) is not deductible.

These extra expenses, due either to an extension of time or extra mileage, must be excluded from the business schedule.

DIVISIBLE EXPENSES

Some expenses that a quarry owner sustains may be partly of a business nature and partly personal. How he treats such expenses, for income tax purposes, will have a bearing on his income tax bill. For an income tax saving, a division should be made between the part of these expenses that are business and the part which is personal. The business part should be reflected in the noncorporate business schedule, as would be the case for any other cost-of-doing-business item.

For example, a taxpayer may use his private car to some extent in his business. All costs (including depreciation) to the extent chargeable to the business should be taken as a business deduction. However, the amount of the deduction should be based on the actual business use to which the car is put. If 50 percent of car useage is due to business use, 50 percent of all costs (including depreciation) constitute a business charge and should be so taken in the business schedule.

Some of the remaining car costs, traceable to personal use, may be taken as personal deductions; others may not. Whether any deductible car expenses are taken as personal deductions, of course, will depend on whether the standard deduction is taken or not. However, whether or not the standard deduction is taken, it is important that all car expenses legitimately chargeable to business should be deducted. Even if a certain car expense in its entirety is deductible as a personal item, such as interest or license fee, it should first be reduced by the amount chargeable to the business. Otherwise, the income tax may be inflated.

The same treatment should be employed in respect to nonbusiness income-producing expenses of a divisible nature, such as maintenance, taxes and interest on a property partly rental, partly used by the taxpayer as his home. Depreciation is an allowable expense on that part rented; it is not allowable on that part occupied by the taxpayer.

This is true also of maintenance. Interest and property taxes should be divided, alloting part to expenses of rental income. That part due to the taxpayer's occupancy may then be deducted as personal items, if the standard deduction is not elected. Maintenance, of course, is not an allowable personal deduction on a taxpayer's home.

Until these divisible expenses are properly apportioned, a taxpayer cannot make an intelligent decision on whether to take the standard deduction or to itemize personal deductions. A fact often overlooked is that the more *legitimate* business expenses and income-producing expenses that are deducted against such income, the lower a taxpayer's adjusted gross income is.

The amount of this adjusted gross income, in turn, often has a direct bearing on whether itemizing or taking the standard deduction is the more advantageous, income tax-wise. The lower the adjusted gross income, the larger the amount of medical-dental expenses, dollar-wise, the taxpayer can deduct after taking into account the 3 percent exclusion rule.

MEDICAL-DENTAL EXPENSES

As in prior years, if *either* the taxpayer or his wife has reached age 65 before the close of the tax year, medical and dental expenses of *both* may be deducted without excluding 3 percent of adjusted gross income. Now the medical and dental expenses for a dependent parent of 65 or over may also be deducted without respect to the 3 percent exclusion rule.

A new tax schedule, Form 2948, Medical and Dental Expense State-

From his own self-interest, a taxpayer should see to it that he does not pay the government more *than is necessary. Treasury Department spokesmen have repeatedly noted that the full income tax due is expected . . . but no more.*

ment, has been prepared for taxpayers who are entitled to more liberal deductions for medical and dental expenses because of their age, or the age of the wife or dependent parents. This new tax schedule is considered the simplest method for taxpayers to reflect the more liberal medical expense deductions. Copies of Form 2948 are available at local offices of the Internal Revenue Service. Remember: Even if the 3 percent exclusion rule applies to the taxpayer's own medical expenses, he can ignore it on the medical expenses of a dependent parent age 65 or over.

Transportation expenses directly attributable to obtaining medical care are deductible medical expenses. These may include the transportation expenses of a parent accompanying a child. An example would be the cost of transportation going to and from hospital or the physician's office.

Vitamins, taken for the preservation of general health, are not deductible costs. However, if they are *prescribed* by a physician, they qualify as medicine or drugs.

SALES TAX

Until now, taxpayers living in areas in which states, counties, or local agencies collect sales tax, have been baffled as to how to calculate such a deduction. Tables prepared by District Directors are available to taxpayers on request. These tables are based upon the sales tax prevailing in each area, upon how widely the tax applies to categories of goods and services, and upon income brackets. Thus, a table prepared for one area will not, necessarily, be applicable to another area. Taxpayers desiring a table should apply to their nearest District Director of Internal Revenue Service.

Consider the accompanying table (abbreviated for this article)—only as an *example*, and *not to be used* unless applicable. It was prepared for one area where there is a 3 percent state sales tax and a 1 percent local sales tax:

Adjusted Gross Income	Sales Tax Deduction
$3,000 under $3,500	$45
$5,000 under $5,500	$71
$7,500 under $8,000	$101
$19,000 under $20,000	$195

The issuance of such an averaged sales tax deduction table does not prevent a taxpayer deducting a larger amount, *if the facts surrounding his case justify it*. However, he may be called on to substantiate such a deduction. If the table is used, the deduction is not likely to be questioned.

CHARITABLE AID TO STUDENTS

In September, 1960, the Internal Revenue Code was amended to provide for deducting the cost of maintaining certain students in a taxpayer's household as a charity act. To qualify as a charity deduction, the student must *not* be a dependent or relative of the taxpayer. He must be a member of the taxpayer's household by *written agreement* between the taxpayer and a qualified charitable, religious, educational, or other organization, contributions to which are deductible for federal income tax purposes. Such an organization must sponsor the student, and must be engaged in a program to provide educational opportunities for pupils or students placed in private homes by the organization.

In addition, the student must be attending an educational institution in the United States on a full-time basis in the 12th or any lower grade.

The taxpayer must not receive any money or other property as compensation or reimbursement for maintaining the student in his household.

The charitable contribution for maintaining such a student may exceed $50, multiplied by the number of full calendar months during the taxable year in which the student is in the taxpayer's household. A calendar month is considered 15 or more days in the month. The amount of the allowable deduction must be supported by records evidencing the actual cost of maintenance. Supporting records may be closely scrutinized. Note that while the charitable deduction may be less than $50 a month, based on the maintenance costs facts, it may not exceed $50.

CIVIL DEFENSE DEDUCTIONS

If a taxpayer is engaged in Civil Defense work on a *volunteer* basis, he can deduct his actual out-of-pocket expenses—but not the value of his time contributed. "Actual unreimbursed expenses incurred by Civil Defense volunteers," according to an Internal Revenue Service ruling, are deductible in an income tax return "if connected with and solely attributable to the rendition of such volunteer services."

DEPENDENTS' SUPPORT

A good many taxpayers still do not understand the rules in respect to dependents jointly supported by two or more individuals. The result is that the exemptions are lost. For example, a taxpayer and two brothers jointly support a dependent mother. Between them, they contribute more than one-half of her support. Any one of the brothers, by agreement among themselves, can claim the mother as a dependent, provided that the one claiming her as a dependent contributed more than 10 percent of the support. The others must not claim her as a dependent, and they must sign a written statement on Form 2120 waiving any claim. These forms must be attached to the return of the taxpayer claiming the exemption. By rotating the exemption each brother, in this example, would have an exemption every third year.

Opposite page:
AN OVER-ALL VIEW of British Columbia Cement's 3,200,000-bbl. wet process plant on Vancouver Island. The new primary crushing installation, shown in other photos on these pages, is located on an upper level of the abandoned quarry, just out of view at the upper right.

ONE OF THE QUARRY TRUCKS here discharges a load of stone into the glory-hole feed bin after a 9-mile trip from the Cobble Hill quarry. The primary crusher building below houses the 42-in. gyratory crusher and a 45-ton traveling bridge crane to service the heavy equipment.

British Columbia Cement's Automated Crushing-Blending System

By HARRY F. UTLEY

ANOTHER ON THE SPOT report

MODERN electronic control devices, combined with an application of plain old-fashioned gravity, make the new $900,000 three-stage limestone crushing department at the Bamberton plant of the British Columbia Cement Company, Ltd., a highly efficient operation.

Closed-circuit television permits a central operator to observe the various stages of raw material preparation. Tape recordings automatically broadcast warnings over loudspeakers throughout the plant 2 minutes before a production cycle is about to begin. Two levels of an abandoned quarry, one 150 ft. above the other and up-slope from the cement plant, have been adapted to provide gravity flow of material from crushers to plant.

The layout was conceived and developed by the technical staff of the cement company, with Wright Engineers, Ltd., of Vancouver, B. C., as structural and mechanical consultants.

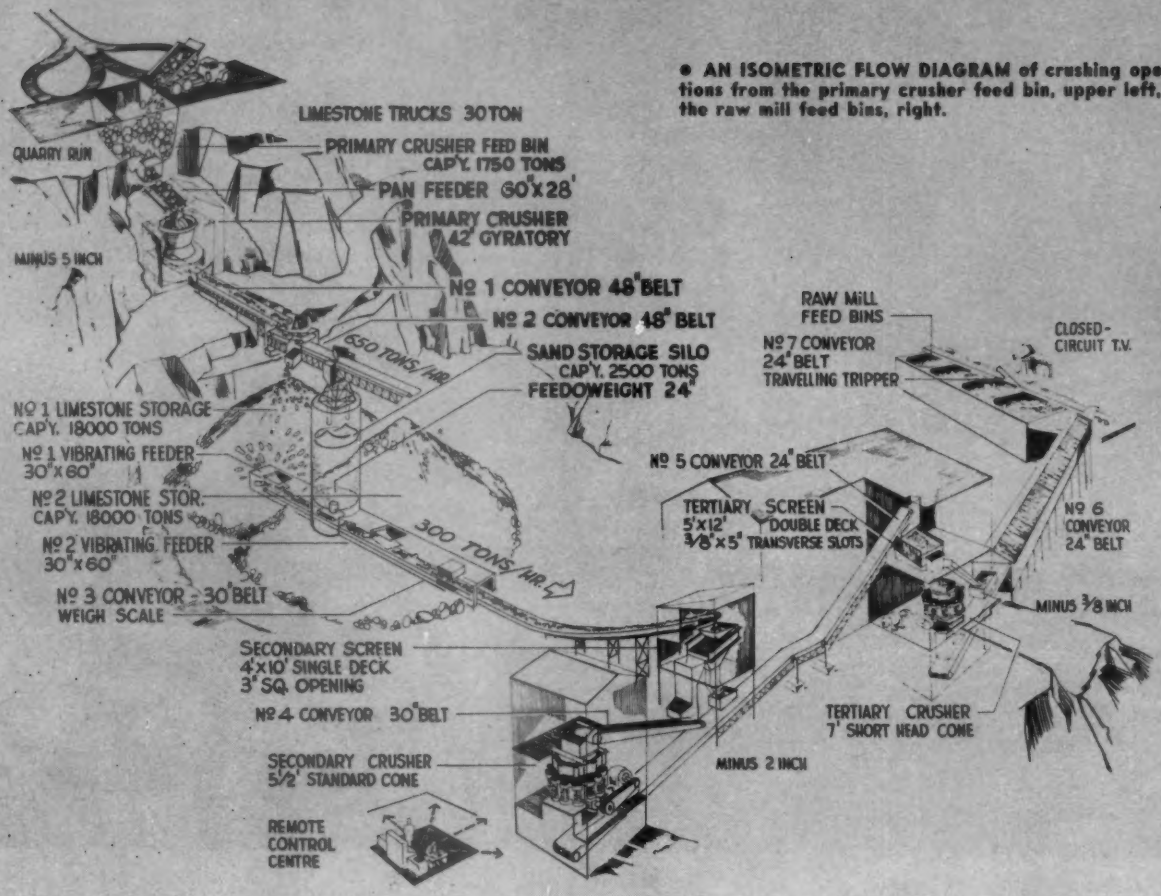
The wet-process plant, on Saanich Inlet, 25 miles north of Victoria on Vancouver Island, was established

48 years ago. In 1952, when a 350-ft. rotary kiln was added to supplement the three existing 185-ft. kilns, its capacity was enlarged to about 2,000,000 bbl. In 1957 another 350-ft. Vickers-Armstrong kiln was installed, raising the total annual capacity to 3,200,000 bbl. At that time, finish-grinding capacity was also increased to match clinker output by installing a 13- by 16-ft., 1500-hp. Traylor ballmill.*

About 35 years ago, a high-calcium limestone quarry was opened on Texada Island, the crushed stone being barged over water the 90 miles to the Bamberton plant. A few years ago the water haul was eliminated when a new quarry was opened up at Cobble Hill on Vancouver Island, only 9 miles from the plant. A private paved road now connects the Cobble Hill quarry and the plant, end-dump trucks transporting the stone. (*Turn page*)

CRUSHER FEED. The 5- by 28-ft. pan-feeder which supplies the quarry-run limestone from the glory-hole feed bin to the 42-in. primary gyratory crusher.

*Two earlier articles by the author traced these developments in detail. See PIT AND QUARRY, November, 1953, and September, 1957.



• AN ISOMETRIC FLOW DIAGRAM of crushing operations from the primary crusher feed bin, upper left, to the raw mill feed bins, right.

Major Features The new crushing department features (1) a surge bin to feed quarry-run rock to the primary crusher, and (2) automatic control of primary product recovery, secondary and tertiary crushers, and remote-controlled filling of the mill feed bins. Only one man is now required for a period of 5 hours daily with the new setup; 12 men were needed to operate the former crushing department.

Normally in cement manufacture, quarry trucks deliver direct to a primary crusher on short hauls. At Bamberton, however, it would require a fleet of nine trucks in constant operation to haul the needed 2,000 tons per day by this system. Any delay enroute or in unloading would bottle-neck production.

In the new crushing system the 42-in. primary crusher was installed at the bottom of the 100-ft. face on the upper level of the abandoned quarry above the plant. This location provided sufficient height to allow excavating a 1,750-ton capacity primary-crusher glory-hole feed bin in the upper part of the face; and a feeder tunnel was driven horizontally into the face, so that the receiving end of the feeder was directly below the glory-hole.

With a height difference of 150-ft. between the two old quarry levels, the lower level was utilized for storage of minus 5-in. primary-crushed stone. The storage method involves two conical piles, each having a 18,000-ton live capacity. This provides surge capacity to permit the fine-crushing department to function in the event of a primary system interruption, or the suspension of quarrying and transportation in severe winter weather. But more important, perhaps, it permits reclaiming a uniform blend of raw material.

Small-scale experiments had indicated that blending would be satisfactory if there were no recovery from a given pile until it was completely filled, and if there were no more material added to that pile during the reclaiming period. In building a pile, each day's run from the quarry is deposited in a conical layer on one of the storage piles. The time required to fill one pile is about 9 operating days. By reclaiming from a single opening directly under the center of the pile, a part of the daily conical layers is withdrawn each day, and a uniform blend is achieved. During the period of recovery from one pile, the other is built up.

Primary Crushing The trucks discharge into the glory-hole receiving bin (which has almost vertical walls) at a point directly above the withdrawal point, permitting the segregated fines to land closer to the withdrawal opening. When the coarse rock slides into the withdrawal point, it carries the fines along with it. The material then moves down and out of the bin through a 12-ft. round opening in

the roof of the tunnel, from which a 5- by 28-ft. Stephens-Adamson manganese-steel pan feeder picks it up for delivery to the primary crusher. Normal speed of feeder travel is 10 f.p.m.

The 42-in. Nordberg gyratory crusher can reduce the quarry-run stone to minus 5 in. at a rate of about 650 t.p.h. The crusher is driven by a 250-hp. slip-ring induction motor. Primary-crushed product is then carried by Conveyor No. 1 to the edge of the upper level, where it is transferred to Conveyor No. 2 for delivery and distribution to storage. These belt conveyors are 48 in. wide; No. 1 travels at 300 f.p.m.; No. 2 at 350 f.p.m. Each is driven by a 30-hp. squirrel-cage motor with encapsulated windings through David Brown Radicon worm reducers and chains. Jeffery pulleys and idlers were used on all the belt conveyors in the new system.

In order to gain sufficient height for the desired capacity of the primary crusher feed bin, Conveyor No. 1 was placed in a trench 10 ft. wide and 20 ft. below ground in the upper quarry level. The bottom of the trench slopes down and away from the crusher to provide drainage.

Conveyor No. 2 has a 110-ft. truss span and a cantilever section 45 ft. long. The central support is a steel tower above a reinforced concrete sand storage silo which, in turn, straddles the reclaiming tunnel in the floor of the storage area. Limestone is discharged either from a fixed pants-leg chute at the center of the main span, or off the head pulley at the far end of the cantilever.

The crusher house is of steel and concrete construction, 40 ft. wide, 50 ft. long, and 50 ft. high. One end of the building rests against the rock face and encloses the discharge opening of the feeder tunnel. The opposite end is entirely open. At one side of the building is the crusher-operator's control room. At his position, he can see the bottom of the crushing cavity and all exposed rock on the feeder, and through a side window he can observe both No. 1 and No. 2 conveyors in operation. The control panel includes start-stop stations for the feeder, the crusher oil pump, the crusher, the two conveyors, and a variable-speed control for the feeder drive. The system is provided with the usual interlocks.

GENERAL VIEW showing the roof of the primary-crusher building, lower left, and conveyors No. 1, 2, 3, and 4 in the upper and lower levels of the abandoned quarry.

Fine-Crushing Department From a central position in the raw-grinding mill, the entire fine-crushing system—from recovery of the minus 5-in. rock from storage to the delivery of minus ⅜-in. or smaller material to the mill feed bins—is remotely controlled and is almost 100 percent automatic. Panels with controls, alarms, feeder and weigh-scale-rate indicators, and the television monitor are placed so that the grinding-mill operator may regulate the crushing, conveying, and bin-filling operations, *in addition to his duties as mill operator!*

Either of two 30- by 60-in. Jeffrey vibratory feeders in a 265-ft. concrete tunnel under the primary-crushed storage supply stone to reclaim Conveyor No. 3. Feldspathic sand is recovered from the concrete silo previously mentioned and proportioned by Merrick Feedoweight to Conveyor No. 3 along with the limestone. The sand supplies the required alumina and iron constituents and represents about 15 percent of the total raw material. In its usual damp condition, the sand has poor handling characteristics; so a special extractor was designed and installed to prevent arching at the discharge opening in the silo.

Shortly before leaving the reclaim tunnel, all material on the belt is weighed as it traverses a Trans-Weigh electronic conveyor scale. These weights are electrically transmitted to a continuous recorder in the control room in the mill building.

Conveyor No. 3 is 30 in. by 702 ft. on centers and inclines upward to the secondary-crusher scalping screen. This is a 4- by 10-ft. Dillon single-deck unit with 3-in. square openings on its single deck to bypass undersize from the secondary crusher feed. Screen oversize passes to Conveyor No. 4 (30 in. wide and 50 ft. o.c.) feeding a 5½-ft. Symons standard secondary cone crusher set at 2 in. Both product and screen throughs discharge to Conveyor No. 5 (24 in. by 430 ft.), which rises 55 ft.

in two stages to feed the tertiary scalping screen, a 5- by 12-ft. Dillon double-deck unit with 1-in. openings on the top deck and ½-in. on the bottom. Oversize goes to the 7-ft. Symons short-head tertiary crusher. This crusher has a closed-side setting of ⅜ in. and operates in open circuit at present. Two more belt conveyors (No. 6 and No. 7) then carry the mill feed material to the mill building.

The raw-grind department employs five ball and tube mills. There are two rows of five square feed bins, two for each mill. Conveyor No. 7 runs along the top of the bin rows, and discharge to the bins is by travelling tripper.

STORAGE. This view is of the primary crusher product storage area before filling. The reclaim tunnel is at the lower left. Sand is stored in the silo and fed from it.

Automatic Controls Operating conditions are observed by the mill operator on a closed-circuit TV screen at his control station. The television equipment was supplied by General Electric of Canada. Conveyor No. 3 scale automatically controls the vibrating feeders to maintain a constant recovery rate of the minus 5-in. limestone. Appropriate time delays reduce periods of over- or under-control due to the distance between the feeders and the scale.

The set-point weight is established at the scale recorder on the control panel, and the automatic feed adjustment signal is transmitted to pilot motors on the vibrating feeder rheostats in the recovery tunnel. Sand is fed at a fixed rate to produce the required proportions in the total weight set on the conveyor-scale controller. Accuracy of proportioning is obtained, and control is simplified by automatic adjustment of the rock weight alone, without further change in the sand feed rate.

Following establishment of the feed rates, the touch of a single button starts up the fine crushing system in sequence from the discharge end.

Before any machinery moves, however, there is a delay period of two minutes during which the tape-recorded warning of the impending start is announced over loudspeakers along the system.

Operation of the system depends to a large extent on automatic detection of operational faults, since there are no crusher operators on patrol. Zero-speed switches are driven from a return idler near the tail end of each conveyor, interlocking that conveyor with the unit feeding it.

Crushers cannot start unless the oil pumps are developing proper pressure; they will shut down if the pumps fail. In the event of an automatic shutdown, crushers run long enough to clear themselves.

Transfer chutes are fitted with plug-up detectors, and the conveyors have belt deviation detectors.

Flashing lights on the control panel pinpoint the location of any trouble, and the ringing of a bell attracts the attention of the operator. An electromagnet and an electronic metal detector protect the fine crushers from tramp metal.

A selector switch and a pushbutton station allow independent operation of each unit from a point near its drive motor. This is primarily for convenience during maintenance. Telephones located at key points help to reduce delays in locating and clearing trouble.

The British Columbia Cement Company's technical staff were in over-all charge of the new installation. Many of the facts contained in this article were gleaned from a technical paper covering the project, prepared by R. E. Haskins, vice-president for production, and A.S.G. Soulsby, project supervisor.

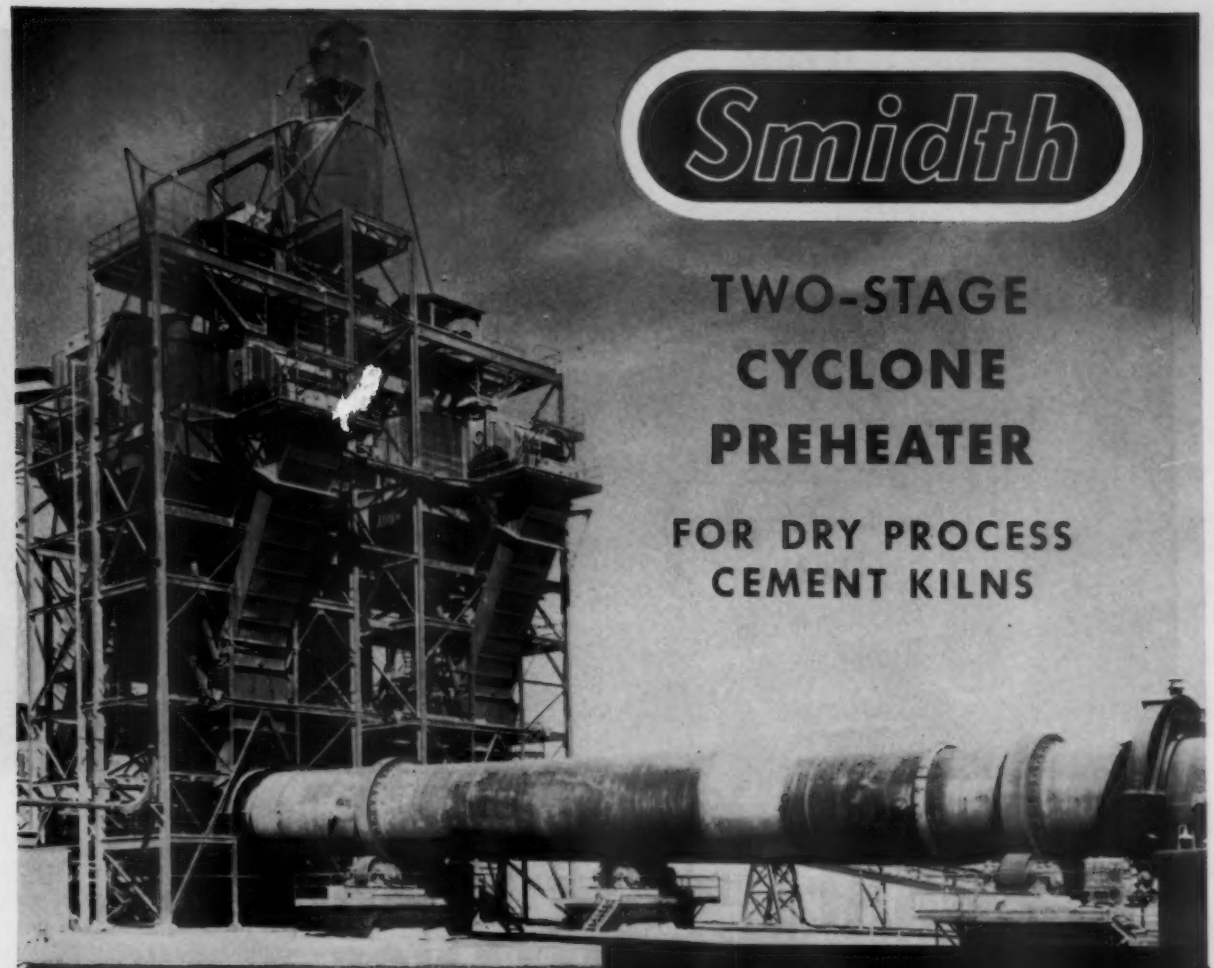
1960 Fuller's Earth Production Remains Relatively Stable

During 1960 the tonnage of fuller's earth sold or used by producers declined only a fraction of 1 percent from 1959. The value increased a little over 1 percent, according to reports from domestic producers to the U. S. Bureau of Mines.

Major uses reported were: absorbents, 46 percent of the consumption; insecticides and fungicides, 24 percent; and rotary-drilling mud, 14 percent.

Florida continued to be the leading state, producing 62 percent of the total.

The average value reported was $22.44 per short ton, compared with $22.04 in 1959 and $21.26 in 1958.



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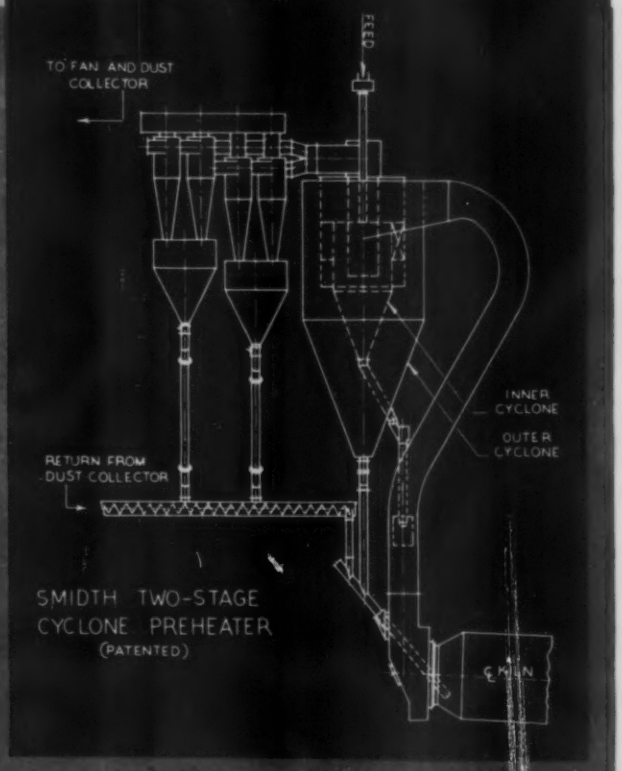

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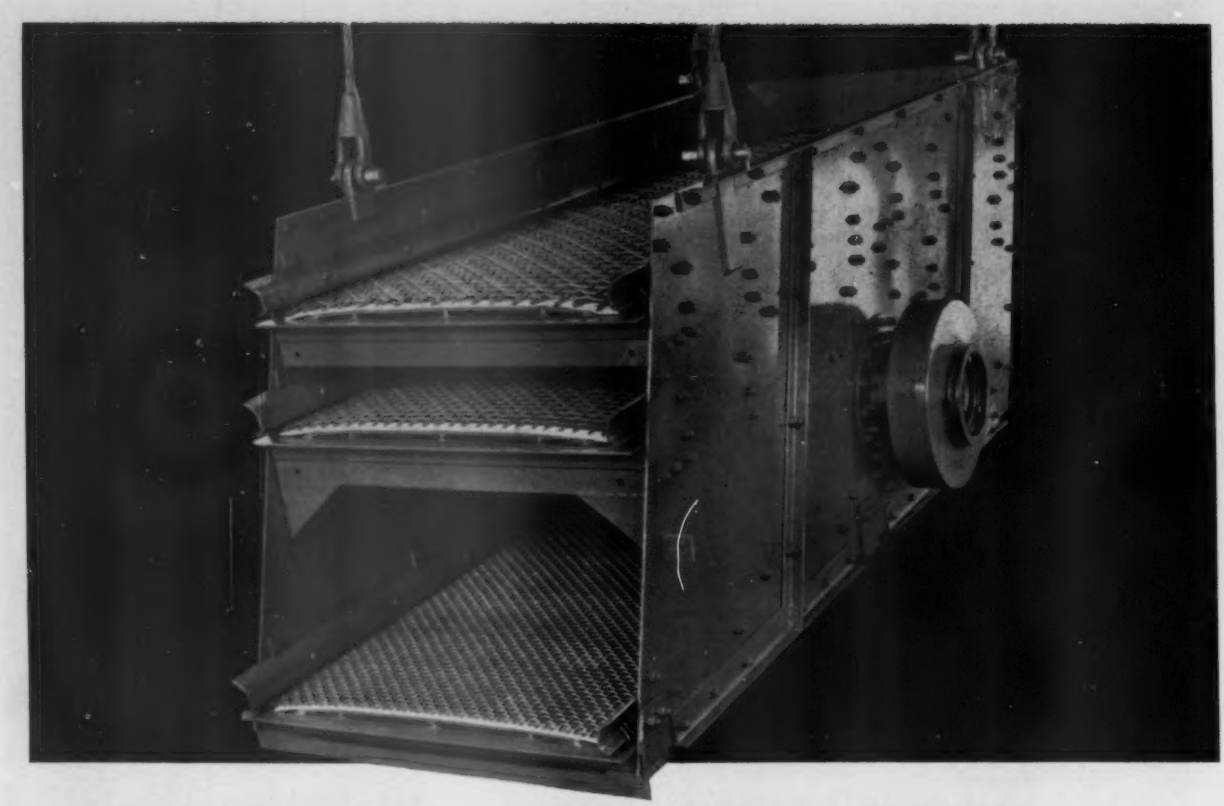

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Electrical Calculations For Heated Screen Decks

By IRVING WARNER

FREQUENTLY there has been trouble with heated screens due to failure to consider or calculate the electrical characteristics of the screening surface—particularly if the screen wires do not have sufficient resistance to heat up as desired.

Although a screen may have been calculated correctly for initial installation, operating men will often change to a heavier wire, or make other revisions without giving consideration to electrical recalculations. Every screencloth is a problem in itself and must be checked for the required characteristics before installation.

Cloth of stainless steel, such as No. 304, is considered essential—not only because it stays clean and does not pit or corrode, but also because it has about twice the electrical resistance of ordinary steel. This is especially pertinent since it is always a problem to get enough electrical resistance in the surface.

The following formula and its several factors are offered as an example of the typical calculations that should be made. Despite the many elements of the formula, it is nevertheless quite simple.

In the formula

$$R = \frac{O \times Y}{d^2 \times M \times H}$$

R=Resistance of the system (total)

O=Resistance of wire in ohms per circular mil per foot of length. Stainless steel No. 304 (a suitable material) has the value of O=425

Y=Actual width of screen in feet. (The electrical distance is usually about 3 in. less than the nominal width of the screen)

d=Diameter of wire in mils (1 in. equals 1,000 mils). Note: in all electrical wire tables, the area of a wire is given in circular mils, or d^2

M=Cross wires (per inch) that carry the current

H=Length of screen heated (in inches).

Electrically, $R = \frac{E^2}{W}$

or, Resistance $= \frac{\text{voltage squared}}{\text{watts}}$

$$E^2 = R \cdot W = \frac{O \times Y}{d^2 \times M \times H} \cdot W$$

(W = rating of transformer).

In buying a transformer, ascertain the output capacity. A 15 kv.-a. transformer is certainly good for 12,000 watts. Then,

$$E^2 = \frac{12{,}000 \times O \times Y}{d^2 \times M \times H}$$

An example of calculation is as follows, when

d=(wire selected)=.105=105 mils

d^2=11,000 (circular mils)

M=2.8 on the basis of a screen with .25-in. openings, .105 wire

Total wire centers equal .25 plus .105=.355

Wires per inch equal 1/.355 or 2.8

O=425 (No. 304 stainless) or resistance per circular mil of area by 1 ft. of length

Y=3.75 ft. (for a 4-ft. wide screen

H=60 in. (each heated panel being 60 in. long).

With the above figures:

$$E^2 = R \times W = \frac{12{,}000 \times 425 \times 3.75}{11{,}000 \times 2.8 \times 60 \text{ in.}} =$$

10.5, and $E = \sqrt{10.5} = 3.22$.

Amperage then is $\frac{12{,}000 \text{ watts}}{3.22 \text{ volts}}$

or 3,730 amperes.

If it isn't possible to get a transformer to supply the 3,730 amps, on the secondary side, wire of smaller diameter must be used; or the length of the panel heated by the transformer must be reduced. If possible, the size of the wire should be the first consideration. Perhaps, however, H — or the length of the panel — is the only one of the two factors that can be reduced.

For a greater length of heated deck, additional transformers should be used. Panels can be placed in series to increase the resistance and voltage, and to decrease the amperage. Although this can admittedly be a difficult design job, it can be and has been done.

The amount of energy necessary for a new installation cannot be calculated ahead of time. An estimate can be made only on the basis of experience, and with the advice of suppliers. Various factors enter in, such as the tonnage of throughput, the size of the screen opening, the percentage of fines to be passed, and the percentage of moisture in the feed under the worst conditions.

Materials will vary in their requirements. For example, dolomitic stone will require more heat than a high-calcium stone. Therefore, a comparison of performance cannot be used with precision unless all the conditions are the same, and intelligent guesses are necessary.

A word of caution is in order. Stainless steel is more vulnerable to fatigue than ordinary steel. Hence, it is highly important that the surface of the screencloth be kept taut, so that all whipping is avoided. Heating of the screening surface aggravates the problem because the wires lengthen with higher temperature, and tension tends to drop off. For this reason, unnecessarily high temperatures must be avoided. Power should be turned off promptly if the screen is stopped, and even if the feed is interrupted for any length of time.

Despite such problems with installation and operation, electrically heated screens are often a very valuable addition to certain plant processes.

Operations recently began at the new Springdale, Ark., plant built by Arkhola Sand and Gravel Company of Fort Smith, Ark. Deliveries have begun on both concrete block and ready-mix from the new plant. Capacity at the ready-mix plant is 50 cu. yd. per hr., and block production is rated at 1,000 block per hr. It is the third such operation set up by Arkhola in northwestern Arkansas.

Important Role of Industrial Minerals In U. S. Economy

REVEALED AT MINING CONGRESS

By HARRY F. UTLEY

RENEWED attention is being focused on America's mineral resources as a bulwark of free-world strength while the international situation continues grave. War clouds in Europe and unstable conditions in Africa, Asia, and Latin America gave special significance to the deliberations of the American Mining Congress during its annual convention, held in Seattle from September 10 to 13.

The meeting attracted more than 2,000 registrants, and most convention sessions were devoted to technical and other problems of metal mining. However, several of the papers were of prime interest to producers of nonmetallics.

Pointing out that the current ratio in value of production between industrial minerals and metals is about 3 to 1, Richard M. Foose declared that all the recent gain in total mineral commodity products in the United States can be traced directly to the industrial minerals.

Mr. Foose, chairman of the Department of Earth Sciences of Stanford Research Institute, championed the strong role of industrial minerals in an address delivered at a session devoted to the state of the mining industries.

"Although many characteristics in the production and marketing of industrial minerals differ from those of the metals, one main aspect they have in common is direct sensitivity to the cost of labor and transportation," he declared. "Inasmuch as most of the minerals have to be won from the ground by a variety of mining methods, labor cost continues to be a key factor in production and marketing. In fact, for a large group of the industrial minerals it is more critical because they are lower-priced commodities, with consequent lower profit margins. This prompts the speculation that within the next decade there will be an increasing emphasis on the ability to produce industrial minerals—and metals as well—from those geographic areas where total production costs are cheaper. One could predict an intensive exploration and greatly increased production of all mineral commodities from a narrow zone immediately adjacent to the continental borders or wherever there is easy accessibility to cheaper waterborne transportation.

"The recent establishment of a major cement facility by a joint venture of two of the nation's large metal-mining companies on the East Coast is a good example of this trend.

"The principal problem faced by many who mine the large-volume, low-cost mineral commodities for the construction industry is the cost-price squeeze brought about in recent years by inflation, the rising costs for equipment, freight rates, and labor. These forces have been responsible for certain trends which are taking place in the industry.

First, many producers have moved vigorously to boost efficiency and reduce costs by increased use of automation. For example, one of the most highly automated cement plants in the industry is run from a control room where, with the aid of TV cameras watching over the kiln, operators can perform every cement-making function from initial crushing of the limestone rocks to final storage.

"Second, when possible, producers are seeking to upgrade their products to command substantially higher unit prices.

"Third, a trend which has grown rapidly in the last year or two has been the absorption by large industrial complexes (such as mining and cement companies) of smaller companies producing nonmetallic minerals like crushed stone, sand and gravel, lime, and gypsum, and such consumer industries as ready-mixed concrete and concrete products."

In structural materials, Mr. Foose predicted that concrete—reinforced, precast and prestressed—will assume a dominant role. Particularly in the South and Southwest, where steel is under a transportation handicap, more and more buildings with tilt-up side and roof panels are being erected; and a big factor in this trend, he declared, is the remarkable advances in concrete technology in recent years. "Architects who once could specify only flat surfaces in concrete can now design curved and three-dimensional surfaces that support great loads," he told his listeners.

In Mr. Foose's opinion, the recent erection of large cement plants in the East and Midwest has greatly disturbed old-line producers because

Adolph Mitterer—"Bristol Lake in the Mojave Desert in southern California is the major source of rock salt and calcium chloride in the West."

R. K. Barcus—"San Francisco Chemical's new phosphate operation near Vernal, Utah, is based upon a huge deposit which, while low-grade, is extremely consistent and amenable to wet beneficiation."

of the threat of over-capacity, plus the certainty that these highly automated installations with low production costs will be able to market cement competitively hundreds of miles beyond the traditional 150-mile limit.

"The lime industry, particularly sensitive to industrial booms and recessions, should fare better in 1961 than in 1960," he predicted. "Two growth factors of importance are: (1) the trend to basic oxygen converters in the steel industry, which increases the quicklime-to-steel ratio from about 25 lb. per ton, to about 140 lb. per ton . . . a factor which will be felt more significantly in two to five years; and (2) the growing use of lime for stabilizing bases and sub-bases in highway construction."

A comparison of the cement industry of Europe and that of the United States was outlined in a paper by Erik Voldbaek, supervisor of kiln operations, Oregon Portland Cement Company. In general, American quarries are more highly mechanized than those in Europe although the methods and equipment used are much the same, he said. The trend in Europe has been to reduce fuel and power costs but to pay less attention to the cost of labor. The reverse is true in the United States.

Mr. Voldbaek reported that the cement production rate in Europe has increased about 10 percent each year since 1950, while the American rate of increase during the same period has been between 5 and 6 percent. Industry expansion on both continents has come about through improving old equipment and methods on one hand, and adapting new equipment and methods on the other.

He described the reverse-cost factors as the most significant differences between the two types of operations. In his opinion, unstable economic conditions in Europe have caused automation to be utilized more slowly there than in this country.

"Due to high fuel costs, the tendency in Europe has been to choose the dry process wherever it is technically possible. It is therefore natural that the companies which make cement machinery have shown particular interest in making appropriate equipment for drying, grinding, mixing, and homogenizing dry cement raw material.

"The drying and grinding processes were previously mostly done in separate machines, but in modern installations the raw materials are almost always dried during the grinding process.

"There are several ways to do this, but the most common type used in Europe is the bucket elevator closed-circuit mill combined with centrifugal air separation.

"The most common dry-process kiln in Europe is the Lepol kiln, which also is known here in America. Lepol kilns are now built for a daily output of 8,000 bbl. and a heat consumption of 550,000 B.t.u.'s per bbl.

"In recent years kilns with other preheating systems have been introduced in Europe, such as cyclone preheaters of different designs.

"The performances of such kilns are close to the performances of the Lepol kiln, but unfortunately, the cement companies operating these new systems have not released very much information concerning output, fuel consumption, maintenance, etc., so far. It is therefore difficult for an outsider to judge if there is a future in these new developments.

"To my knowledge, there is no cement shaft kiln operating in America. In Europe, there are more than 20 plants whose entire clinker production comes from shaft kilns, and there are approximately the same number of plants that have both shaft and rotary kilns operating. Shaft kilns have outputs from 1,000 to 1,200 bbl. per day, with a heat consumption of 500,000 to 600,000 B.t.u. per bbl. Accurate weighing of the raw material and the coal, together with modern methods of pelletizing, makes it possible to produce uniform clinker of a high quality in such kilns."

In a paper titled *A New Source of Silica Sand for the Pacific Northwest,* Hugh H. Bein, manager of the sand division of Del Monte Properties Company of Pebble Beach, Calif., described the new plant of the Lane Mountain Silica Company at Valley, Wash.

The new facility, located about 40 miles north of Spokane, began operating in the spring of 1961 to supply the needs of the glass, ceramic, and foundry industries. According to Mr. Bein, the new Lane Mountain plant is the first operation in the Northwest that can furnish, in volume, high-silica sands for

foundries and low-iron sand for producing flint glass.

(*The writer visited the Lane Mountain plant recently and has in preparation a detailed, illustrated article covering each phase of this interesting operation. It is scheduled for early publication in* PIT AND QUARRY.)

The Effect of Fragmentation on Crusher Performance was reported in a paper authored by James R. Carr, assistant mine superintendent of the National Lead Company, Tahawus, N. Y. Since 1942 considerable effort has been devoted by Mr. Carr's company to improving the drilling and blasting phases of its mining operations. Prior to 1959 the primary objective had been the reduction of drilling and blasting costs on a tonnage basis; however, no permanent compromise of fragmentation was accepted in order to reduce costs.

During 1957 and 1958, Mr. Carr revealed, the 9-in. blasthole was replaced by a 6½-in. hole, and the use of ammonium nitrate fertilizer was greatly increased. These two changes were basically cost-reduction measures but they did affect fragmentation to an extent.

Then, in 1959, improved fragmentation and higher crushing performance became primary objectives. Some progress was made in 1959 without major changes in drilling and blasting procedures and costs. After the 1959 experience it became apparent that further improvement in fragmentation was dependent upon changes in blasting technique. The major changes initiated in 1960 provided the best fragmentation, the highest crusher performance, and the lowest combined drilling, blasting, and crushing costs in the National Lead Company's history.

Digital computers and their application to the mining industry were discussed by James F. Olk, mine superintendent of the Pima Mining Company, Tucson, Ariz.

This firm investigated the use of a computer in determining the economic limits of its open-pit mine expansion. For the purpose of setting up the program for the computer, the expansion area was divided into small segments, and the information for each segment was arranged, along with costs and other data, so that the computer calculated the ore and waste tonnages—not the value of the ore outward from the existing pit—until an economic point of expansion was reached.

As is true with all computer problems, no saving in time or money was made by doing it this way for the first time because of the necessity of setting up the program for the computer, Mr. Olk declared. However, any subsequent problems of this type can now be solved quickly and easily, since the programming has been completed, and only the assembly of data is required.

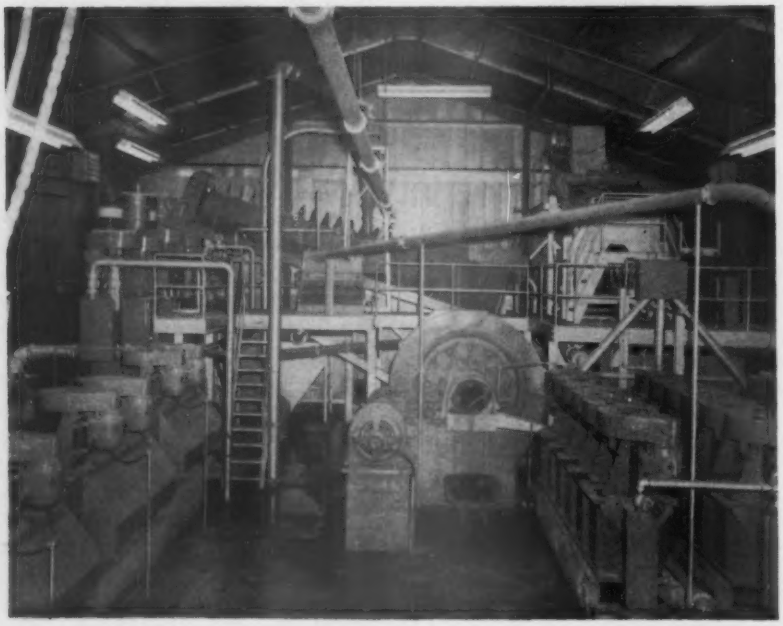
Clyde Holen, plant engineer at Northwest Magnesite Company, Chewelah, Wash., described, with the help of slides, how the ore-hauling system of his company, initially installed in 1917, was automated. The system, a cable tramway, is 15 miles long and capable of transporting 70 t.p.h. of raw magnesite from the mine up in the mountains down to the processing plant. Automation has resulted in an operational labor cost reduction of 83 percent.

According to Mr. Holen, despite a number of problems which had to be overcome in the process of automation, the tram is now operating smoothly and efficiently. Automation has cut maintenance cost, eliminated numerous work hazards, and effected a labor cost decrease.

The open-pit mining and processing of rock salt was discussed in a paper by Adolph Mitterer, manager of the Amboy, Calif., plant of the California Salt Company. Bristol Lake, in the Mojave Desert of Southern California, has been exploited for salt and calcium chloride since 1909, and today, according to Mr. Mitterer, it is the major source of these chemicals in the West.

The central part of the dry lake bed consists of a series of lenticular beds of rock salt interspersed with layers of clay and silt. Permeating the deposit are brines rich in calcium chloride, an unusual constituent for desert saline deposits.

The company produces about 300,000 tons annually, main production coming from the topmost crystalline bed. Overburden is stripped by dragline to expose the salt bed, which varies in thickness from a few inches to as much as 10 ft. Broken by drilling and blasting, the rock salt is loaded into 10-ton rail cars for transportation to



This view inside the mill building of the Lane Mountain Silica plant shows the attrition mills, the flotation cells, the ball mill, and the classifiers which up-grade the sand.

Hugh H. Bein—"Lane Mountain Silica Company's new plant at Valley, Wash., is a modern facility utilizing attrition scrubbing and froth-flotation to process high-grade glass and foundry sands."

the plant. Here the crude salt is crushed and scrubbed in a series of screw washers. The washed and sized product, 98 percent pure, is later loaded into open-hopper rail cars for shipment to two major consumers.

The wash water picks up considerable valuable salt in the process, Mr. Mitterer explained. It is desilted and returned to the mining area, where it is clarified by settling before being pumped into crystallizing ponds. New brine is added frequently, and once or twice during the year each pond is drained of bittern and the accumulated solar salt is harvested.

It is then washed and air-dried before being sold either in bulk or bagged in several screened (or kiln-dried) grades. The bittern is further concentrated by evaporation into an almost salt-free calcium-chloride brine, which is sold in fluid form.

San Francisco Chemical Company produces high-grade beneficiated phosphate from western rock. This is sold to agricultural users not having their own raw-material supplies. Customer requirements have stressed increasing control of specifications, pointing toward beneficiation of all acid-grade western phosphate.

This company's new development 15 miles north of Vernal, Utah, was described by R. K. Barcus, assistant general manager. The operation is based on a large deposit of ore which, although low grade, is extremely consistent and is amenable to the wet-beneficiation methods used.

The first treatment plant went into operation in January, 1961, at a rated capacity of 200,000 tons of concentrate per year. All production is trucked to a single customer at Garfield, Utah, because the plant is located more than 100 miles from the nearest railroad. With construction of rail facilities to the plant later on and a corresponding greater accessibility of markets, it is anticipated that production will increase.

What is hailed as one of the most significant mineral developments in the Western Hemisphere is taking shape near Moab, in southeastern Utah. This single mine and mill of Texas Gulf Sulphur Company will provide muriate of potash at the rate of more than 3,000 tons per day, which is about 40 percent of the total yearly output of the United States in 1959. Capital expenditures to develop this project, the Cane Creek potash deposit, are estimated at about $30,000,000. It marks Texas Gulf Sulphur's first major diversification in the industrial minerals field.

Preliminary details of the project were revealed in a paper by Dr. C. F. Fogarty, vice-president, and Frank Tippie, resident manager for Texas Gulf Sulphur. To date, test drilling and shaft sinking have been carried out. The first contract was awarded to the Stearns-Rogers Manufacturing Company of Denver. Work on all phases of the project has begun. It is expected that the mine and mill will be in production by the end of 1962. By the 1964-1965 fertilizer year, the company expects to be producing at the rate of 1,100,000 tons annually.

After the close of the convention proper, several trips were on the agenda for Thursday, September 14. These included an excursion by ship to Victoria, B. C.; a tour up the slopes of Mt. Rainier; and bus trips to Bethlehem Steel's Seattle plant and Boeing's airplane facilities.

It was announced that the 1962 convention and show of the American Mining Congress will be held September 24 to 27 in San Francisco. The huge equipment exhibit is already in the preliminary planning stage. In September, 1963, the Congress will convene in Los Angeles.

150-T.P.H. Pumice Plant

(*Concluded from page* 103)

closely controlled plaster-mortar aggregate. This product will be packed in 1-cu. ft. bags of 35-lb. capacity.

Loading into trucks from the two finished storage piles is done by individual loading belts operating out of tunnels in the piles. Deliveries are made by truck and truck-trailer directly to users, or to railhead at Santa Fe, where facilities have been erected for loading railroad cars.

About 1500 lineal ft. of Thermoid belting was used in the various plant conveyors, all 20 in. wide.

W. P. Cook, president of the Copar Pumice Co., was recently engaged in the sand-and-gravel business, working a deposit along the Rio Grande River near Espanola. Current demand for aggregates and building products of all kinds is high in the Espanola area since the boom following the activity at Los Alamos, the Atomic Energy Commission's weapons laboratory and research center, which adjoins the area to the west.

Lester Parmer is general manager of the Copar pumice operations.

Initial link is hauling raw limestone to primary crusher. At Ideal Cement's Ada, Okla., plant, fleet of LVX Mack four-wheel dumpers keeps three shovels, including big six-yard dipper, hustling.

STRONG LINKS
in the cement-making chain

With seventeen manufacturing plants, **Ideal Cement Company** is a leading cement producer in the U. S. In the past two years, Ideal has opened new plants at Ada, Oklahoma, and Tijeras, New Mexico.

Each of these new plants is a continuous unbroken cement-making chain. Strong links in these chains are the Mack trucks used to carry limestone from quarry face to crusher. At Ada, for example, Mack LVX's keep pace with three shovels, providing a constant supply of raw material. At its Tijeras quarry, Ideal depends on LRX Macks.

Macks make these all-important links stronger because they are far less likely to fail prematurely . . . require far less maintenance attention . . . and operate at remarkably low cost per ton hauled.

The reasons are easy to recognize. Mack components such as Mack-built transmissions . . . axles . . . frames . . . make up a vehicle that stands up and keeps coming back for more when pitted against truck-punishing jobs.

Make sure you have all the truck you can get under your shovels. Put a Mack to work. Mack four- and six-wheel off-highway dumpers from 15- to 45-tons capacity really put muscle into your quarrying operation. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

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Discharging its load into apron feeder, Mack LVX will soon be ready for return to shovel. Quick spotting at shovel and dump site attests to Macks' maneuverability, good driver vision.

Raw material of portland cement, limestone, is loaded into Mack LRX dumper at Ideal's new Tijeras, N. Mex., plant. Despite grueling pace, Macks require minimum time out for maintenance . . . return long, trouble-free life.

Mining Engineers Mark 50th Anniversary Of Froth Flotation in the United States

THE opportunity to review what is being done in flotation on a world-wide scale was taken advantage of recently by more than 500 metallurgists and mineral engineers. They were in attendance at a symposium held in Denver, Colo., September 17 to 21, which was scheduled as the Commemoration of the 50th Anniversary of Froth Flotation in the U.S.A.

Sponsored by the mineral beneficiation division of the Society of Mining Engineers — a constituent organization of the American Institute of Mining, Metallurgical and Petroleum Engineers—the meeting incorporated six sessions. Frank E. Briber Sr. was general chairman. The international character of the program is apparent in the fact that of 32 technical papers presented, ten were authored by men from Canada, England, Germany, France, South America, Wales, and Italy.

Ever broadening application of flotation, even in industries beyond mining, was the basic theme of the symposium. In addition to the technical material, an informative discussion of the economics of flotation and the part it has played in the development of the mining industry was presented by Frank Milliken, president, Kennecott Copper Corp.

Each technical session was slanted at a particular element of the field of flotation. The general headings of the sessions included New and Future Applications and Uses for Flotation, Kinetics of Flotation, Present Flotation Practices, Milling Circuits Design and Effects on Mining and Smelting, Flotation Mill Control, and Preparation of Ores and Minerals for Flotation.

Under these general headings were grouped the wide variety of outstanding papers. Among the latter were discussions on the following: *Flotation of Micro-organisms* (A. M. Gauding, Massachusetts Institute of Technology), *Future Flotation Research* (D. W. McGlashan, Montana School of Mines), *Aspects of Flotation Cell Design* (A. Jowett, University of Leeds), *Analysis of Flotation Test Data* (C. C. Dell, University of Leeds), *Phosphate Flotation* (I. M. LeBaron, Internation Minerals & Chemical Corp.), *Analysis on Flotation Performance of Iron Ores* (J. W. H. Chi, Jones and Laughlin Steel Corp.), *Flotation's Early Years* (E. J. Pryor, Imperial College, London), *Design of the Flotation Section* (O. W. Walvoord, O. W. Walvoord, Inc.), *Segregation Process* (Carl Rampacek, U. S. Bureau of Mines), *Anionic vs. Cationic Flotation of Potash* (H. N. Clark, Potash Co. of America, *Instrumentation—The Over-all Effects on Flotation Milling* (J. E. Lawver), *Flotation Theory and Mill Control* (G. H. C. Bushell, Consolidated Mining & Smelting Co. of Canada, Ltd.), and *Technical Efficiency of Concentration Operations* (J. R. Stevens and D. N. Collins).

A commemorative volume containing all the papers presented at the symposium has been published as a quarterly of the Colorado School of Mines.

In addition to the formal sessions, there were tours to the Climax Molybdenum operation at Climax, and also the metallurgical department of the Colorado School of Mines at Golden.

Registrants and speakers included (l. to r., rear): Phil Allen (Phelps Dodge Corp.), Norman Weiss (American Smelting & Refining Co.), D. W. McGlashan (Montana School of Mines), Rashon Bhappu (New Mexico Bureau of Mines). Front: Luigi Usoni (Rome, Italy), and A. M. Gaudin (Massachusetts Institute of Technology).

R. R. McNaughton, left front, president of the American Institute of Mining, Metallurgical, and Petroleum Engineers attended the meeting. With him in this group are (l. to r.), Mrs. McNaughton, Norman Weiss, Mrs. Weiss, Mrs. Briber, and Frank E. Briber Sr., general chairman of the outstanding meeting.

Enter 127 on card, page 181 →

TWO ROCK MASTERS AND 900′ BLUE BRUTE COMPRESSOR . . .

HIGH FOOTAGE DRILLING TEAM

What makes the best drilling team? Is it maximum footage? Low fuel consumption? Lowest maintenance? It's all these and more.

Look at the Rock Master drill, for example. It has mobility to get around the roughest ground—to move the air compressor; maneuverability to spot the drill where you want it . . . quickly . . . accurately; stability to hold mast alignment for fast, accurate drilling; simplicity to provide long, trouble-free service; plus the WD-45 Heavy Duty 4½" Drifter for fast drilling.

In one side-by-side comparison the Rock Master put down 3.1 holes per hour. The competitive crawler drill put down 2.7 holes per hour. There's other proof, too, that the Worthington Rock Master can outperform any competitive crawler drill.

What about operation? It has easier, safer controls; a more powerful feed motor for faster steel changes; and an automatic line oiler that reduces maintenance.

What about air consumption? The air consumption of the Rock Master is so low that you can easily operate two units from one 900′ compressor, as is being done on the job above. Or, one Rock Master can operate from a 600′ compressor with plenty of air to spare for boulder popping, running a bit sharpener, a dust ejector or even a blow pipe for cleaning holes!

For the large volume air supply, you can't make a better buy or rental than the Blue Brute 900′ Compressor. It's efficient —less fuel consumed at the end of the day. And it has all the ease-of-operation and safety features you'll ever possibly need.

To get more information on the Rock Master or on the Blue Brute 900′ compressor, call your Worthington rotary compressor distributor listed in the Yellow Pages. Ask him for a quotation, so you can see the Blue Brute drilling team in a truly competitive light. Or write Worthington Corporation, Dept. 61-1, Holyoke, Mass. In Canada, Worthington (Canada) Ltd., Brantford, Ontario.

WORTHINGTON

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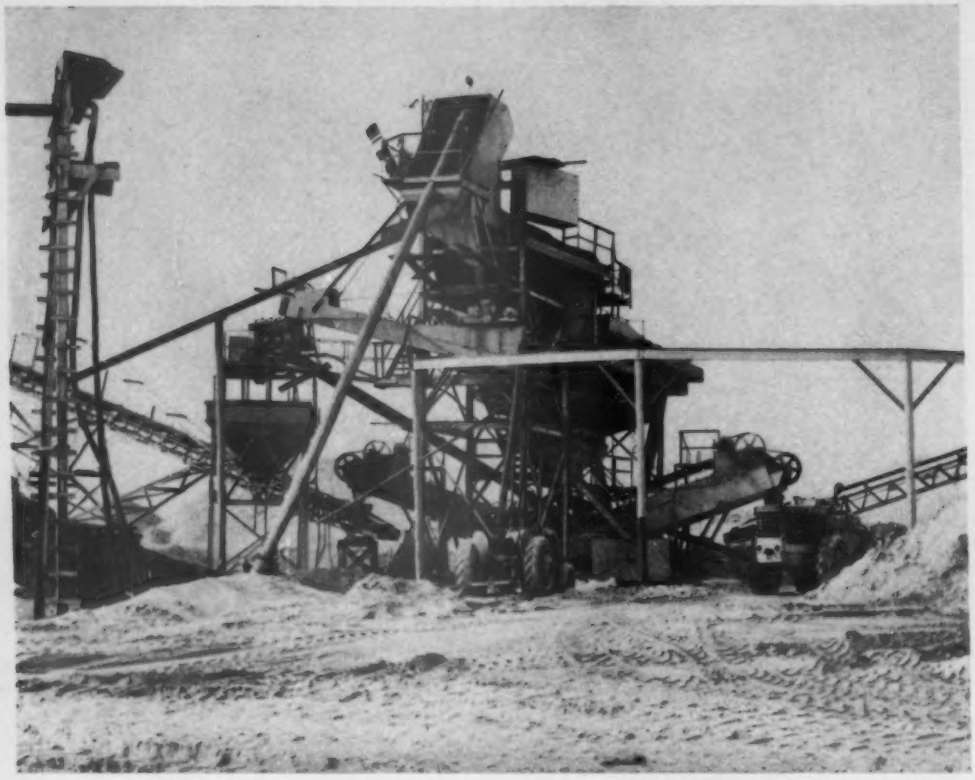
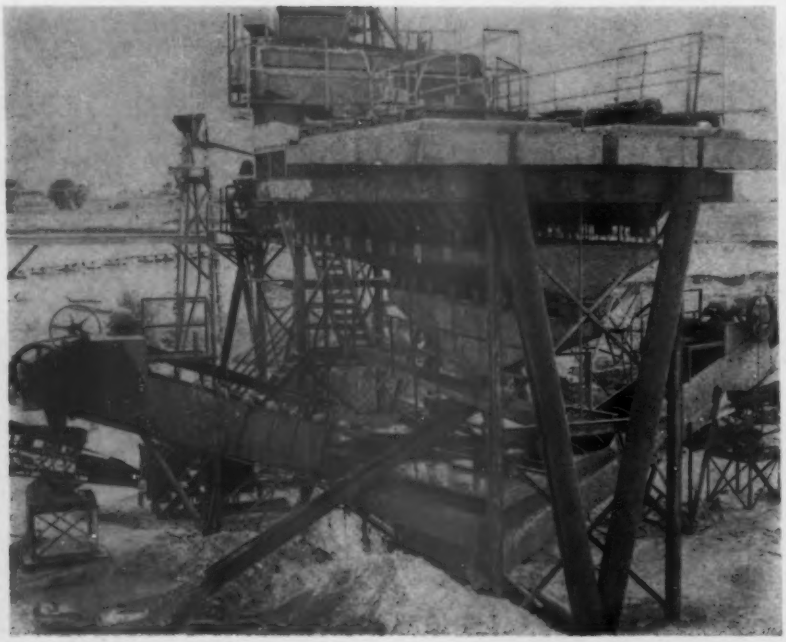


A view from the feed end of the Superior Sand Company installation at Wichita, Kans. The pump box, top center, is fitted with two scalping grizzlies, and the feed is received from the dredge through the 10-in. discharge line. Just below the pump box, and mounted on the screw washer, are the rubber-covered rolls described in the accompanying text.

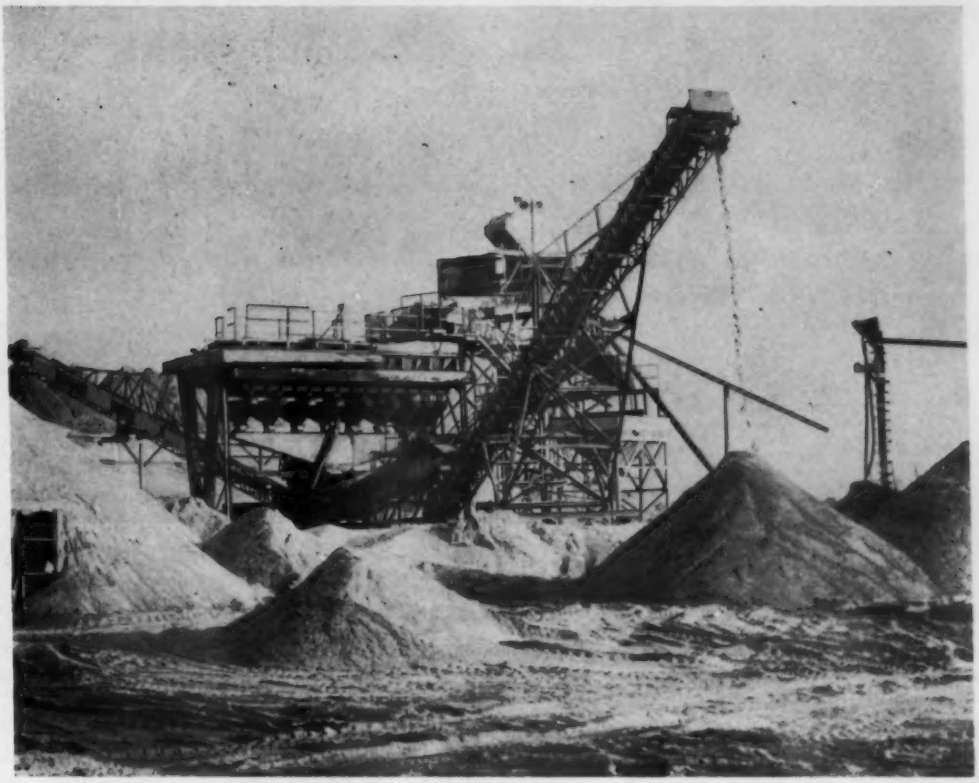
Progressive



A closeup of the 32-ft. double scalping-classifying tank, and the two 44-in. fine-material washing screws. One of the latter processes the fine, medium and coarse concrete sands; the other handles mason's, fill, and grouting sands. Each discharges to a radial stacker.

PRODUCT variety and ease of gradation control are significant features in the operations of the Superior Sand Company, Wichita, Kans. The firm has brought the production of sand sizes to a new high in versatility and range. Specifications for at least three different gradations of concrete sand are readily met in addition to production of mason's, fill, and grouting sands.

The flexibility of processing coupled with an efficiency of operation that has reduced manpower requirements to the minimum puts the company in an enviable market-



A view of the opposite side of the plant from the input end. In the foreground is one of the two radial stockpiling belts, and at the far left the other. The latter stacker can be swung around to discharge into the small elevated receiving hopper, far right, where surplus product can be mixed with water and then piped back to the dredge pond.

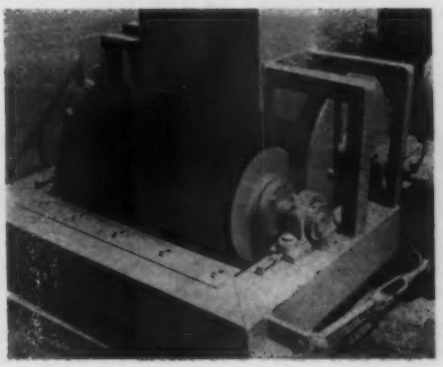
Kansas Sand Plant

◆ Production, marketing of wide product range mark effective operations of Superior Sand Company

ing position. Quality control is obviously paramount in management philosophy, since the plant could easily produce at a higher rate than the normal average maintained—150 t.p.h. At the latter rate, only one man is assigned to the dredge with which the plant is fed, and another man controls the plant equipment.

In addition to an affiliated ready mixed concrete firm, Superior Sand products are marketed to other concrete producers and highway contractors, with shipments made by both truck and rail. Specifications covering the concretes in which the firm's products are used made it necessary to install equipment that would eliminate hard mud balls dredged up in the pit. An unusual application, described subsequently, was made to handle that problem.

The plant is fed by a dredge equipped with a 10-in. Thomas pump driven by a Waukesha LRZ gas engine. Material in place in the



The rubber-covered rolls prior to their installation above the coarse material screw. Mud balls are squeezed down to a thickness of about 3/8 in., the sand remaining unbroken, and discharge falls to the coarse material screw, where it is broken up.

The two reclaiming tunnel belts converge on the point at the left, where either may discharge to the belt supplying the rail- and truck-loading installations.

deposit runs approximately 90 percent minus ⅜ in., and is currently recovered with a plain suction head. The slurry is pumped through about 750 ft. of discharge line to the plant on shore.

Here the flow is discharged into an Eagle Iron Works pump box, which is fitted with two scalping grizzlies. On the first of these, plus 2-in. material is scalped and chuted to a waste pile. Throughs pass to the second grizzly, on which a ⅜-in. separation is made.

Plus ⅜-in. material retained on the second grizzly is chuted to the unusual phase noted earlier which was installed to eliminate mud balls. It is comprised of a roll "crusher" on which the two rolls are covered with Gates rubber, and is mounted above a coarse material washer. Both rolls are driven through V-belts—Dubl-V on the counter rotating roll.

The action of the rubber-covered rolls is analogous to a wringer—the clay and mud balls being squeezed down to about ¼ to ⅜ in. in thickness, with sand particles left unbroken. Flattened mud balls are then easily broken up in the underlying screw washer. Since the unit was installed, production has risen by about 19 t.p.h.

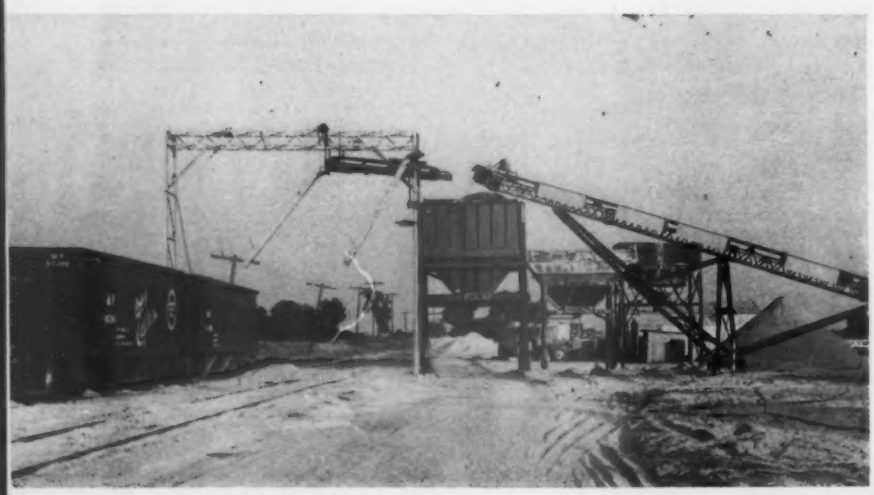
Actually, the 22-in. single-screw washer receiving the discharge from the rolls is a modified older fine material washer with straight sides substituted for flared tub sides, and with a few sets of paddles added. Although it possibly could not handle the job of mud ball elimination alone, in combination with the rubber-covered rolls the process is quite successful.

Discharge from the modified screw is received on the first of two following 2- by 4-ft. Kolman screens. The first of these is a double-deck unit which makes a ⅝-in. separation on the top deck, and ⅜-in. on the bottom. Retained material on the top deck passes to the second screen, on which a single deck makes separation at ½ in., and the two fractions drop into underlying loading bins.

The ⅜-in. fraction from the bottom deck of the first screen may be routed *via* flop gate to join the top-deck material in flow to the second screen, or it may be sent with the bottom-deck throughs to a fine material washer described below.

While the 2- by ⅜-in. material follows the above flow from the second grizzly in the pump box, the minus ⅜-in. fraction passing that

(*Concluded on page* 136)



Rail- and truck-loading facilities incorporate the three truck-loading bins, right center, and the rail-loading conveyor bridge, left. Radial mounting was provided for the conveyor at the right, which receives material from the reclaiming tunnel belts, so that it could be spotted at any loading bin, or connect with the rail-loading bridge.

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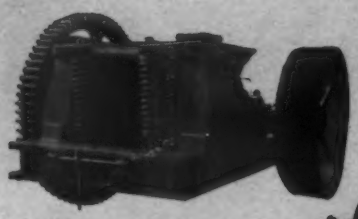
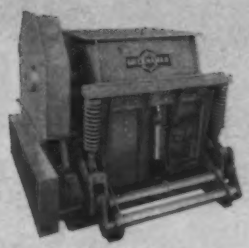


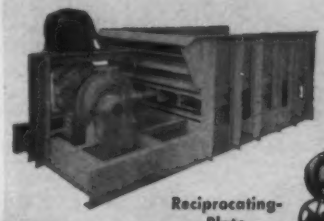
Rockmaster Primary Single-Roll Crusher

Heavy Duty Double-Roll Crusher



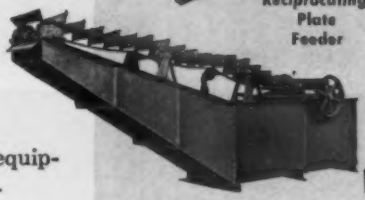
Triple Roll Crusher

EHD Extra Heavy-Duty Scrubmaster

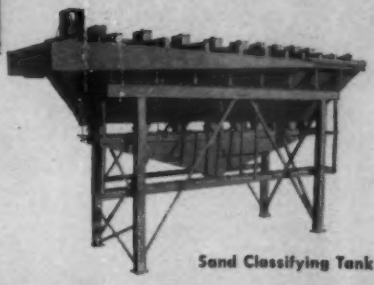


Reciprocating-Plate Feeder

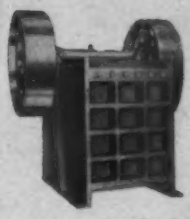
Combination Scrubber and Screen



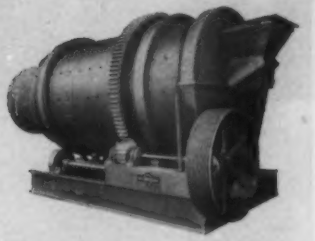
Sand Drag



Sand Classifying Tank



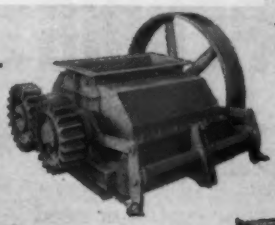
Jaw Crusher



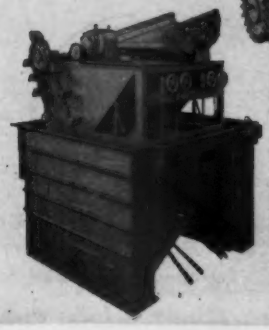
H-D Heavy-Duty Scrubber

Log Washer

Master Mixer

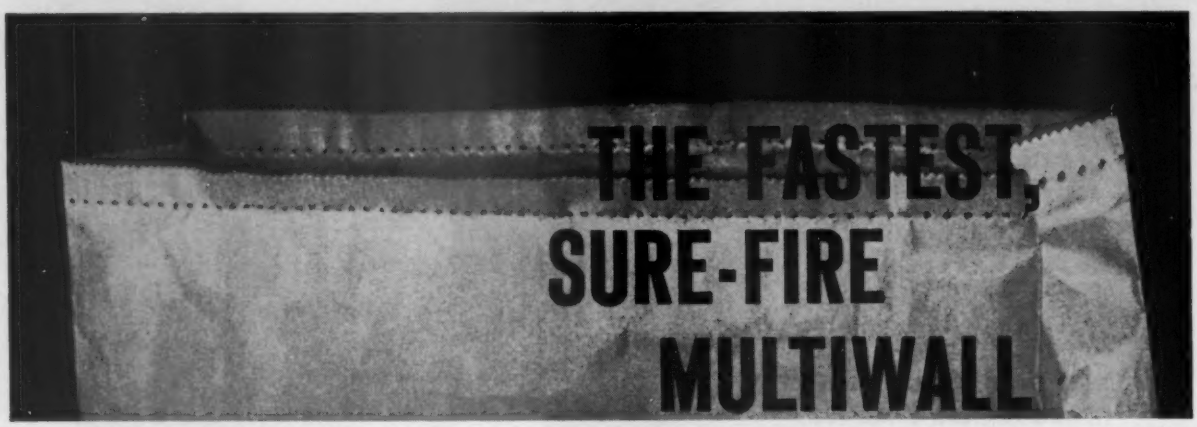


Black Diamond Double-Roll Crusher



Two-Cell Steel Ore Jig

Single and Double Screw Washers



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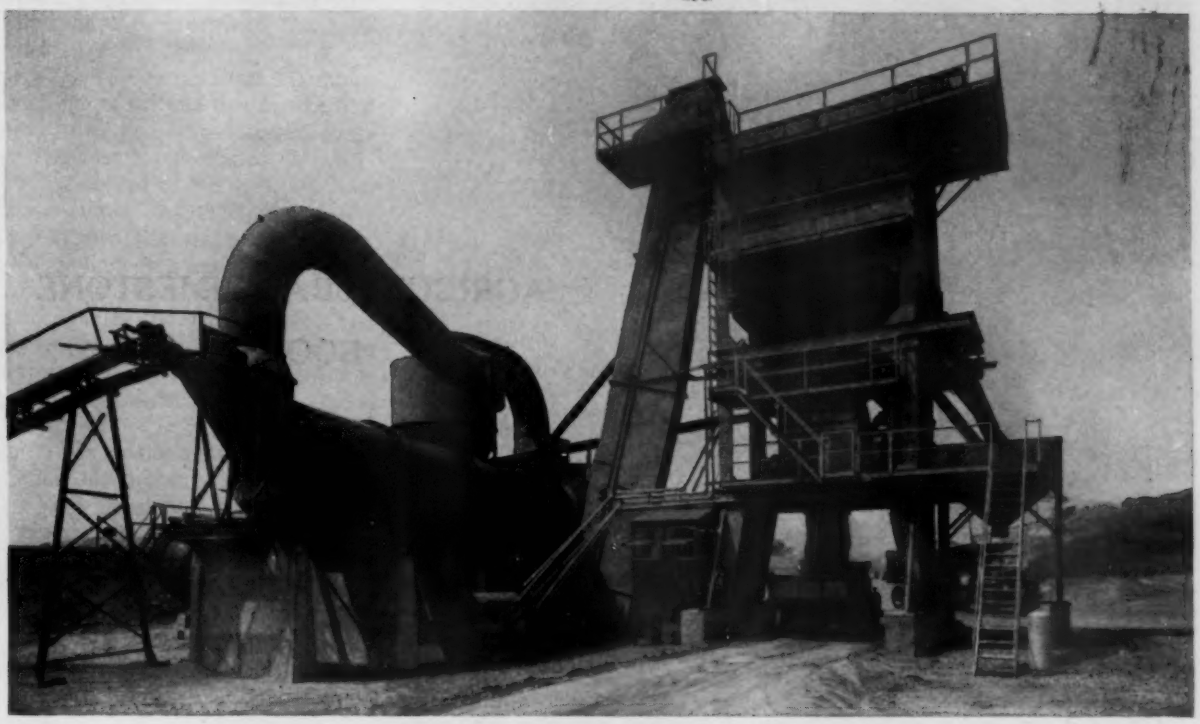
THE USEFULNESS OF A LIMA MADSEN



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All Lima Madsens are clean operating—engineered and built for safety, long life and continual year-round operation. Designed for easy maintenance and accessibility—such as the exclusive externally replaceable sectional mixer liners. Fully automated or remote controls are optional. Positive control by weight of every ingredient; rapid, thorough mixing. Patented pressure injection of liquid asphalt cuts mixing time 10 to 15%, reduces mix cycle to 45 or 50 seconds.

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RIGGED FOR A MORE EXOTIC PURSUIT—swordfishing—the JENNIE M nevertheless served well in the important liming program of Clarks Cove. About 100 tons of aglime were dumped in the waters of the shellfishing areas near New Bedford and Dartmouth, Mass.

AGRICULTURAL LIMESTONE BOOSTS *Harvest from Sea*

BAGGED AGRICULTURAL LIMESTONE supplied by the Conklin Limestone Company was trucked to New Bedford, and loaded here aboard the JENNIE M.

AGRICULTURAL limestone—a proven important aid to the nation's farmers for many years—has recently been applied in a unique project, one that may well lead to an extensive new market for the long-established product.

A rich harvest is at stake in this project—one, however, that won't be reaped from the rich-soiled broad farms of the Midwest, or from the frequently stony soils of New England. It will come from the sea at points where its waters have been treated in an unusual venture that has already proven its worth.

On the shores of Buzzards Bay in southeastern Massachusetts lies the city of New Bedford and its neighboring town of Dartmouth. Extending into the city and town is a body of water called Clarks Cove, a large arm of the bay.

History was made here last summer when 100 tons of agricultural limestone were dumped into the cove. The purpose was twofold: (1) to rid the cove of starfish and

other predators which were destroying rich beds of bay scallops and hard-shell clams which Cape Codders call "quahogs," and (2) to increase shellfish production by changing the ecology of the cove bottom.

The uniqueness of the operation stems from the fact that for the first time the program received state endorsement, represented by sharing in the cost of the work with two communities involved.

Actually, the idea was not new. The liming program was patterned after studies made by a shellfish constable in the little town of Tisbury on the offshore island of Martha's Vineyard. Constable Craig J. Kingsbury carried out his studies with lime in 1959 and 1960 on Lake Tashmoo, a body of salt water opening on Vineyard Sound.

After those two years of experimental work, these were the results:

1. Bay scallop seed survival in limed areas of lake bottom was about 85 percent. In unlimed areas, the survival rate ranged from none in three sections to about 35 percent.

2. The growth and general condition of the scallops in the treated areas were far advanced, compared with those in untreated sections.

3. Two full days of dragging early this year produced only 177 large starfish—and not a single small one was found. Previously, when the dredge had been moved across the pond bottom on two short tows, one dredge yielded 327 starfish and the other 412.

4. The value of the bay scallop catch in 1960 amounted to nearly $13,000 — compared with about $11,000 for the *combined* years 1954 through 1959.

With the development of such impressive benefits, New Bedford, the town of Dartmouth, and the state of Massachusetts went to work to improve the almost depleted shellfisheries of Clarks Cove.

To carry on the work on a broader scope, officials involved turned to another one of New England's historic enterprises — the Conklin Limestone Company, which has aglime producing facilities at Canaan, Conn., and Lincoln R. I.

The Conklin firm delivered a total of 100 tons of bagged aglime, which was trucked to New Bedford and loaded aboard a fishing vessel, the *Jennie M.* In a two-day operation, the material was dumped over the side from the craft as she criss-crossed the cove.

AS A RESULT OF THE LIMING, and based on previous experiments, it is predicted that shellfish production in Clarks Cove next year will double in value.

Before the program was initiated in Clarks Cove, John D. Fiske, biologist with the state division of marine fisheries, had dredged the area, and in every 8-minute tow brought from two to five dozen starfish up from the bottom. Many of these marine animals were taken in the process of feeding on "quahogs," crabs, bay scallops, and other bivalves.

Two months after the aglime "seeding" nearly all of the starfish had been poisoned—but the shellfish were thriving. It is predicted that the liming program, which merely cost approximately $1,400, will result in shellfish production next year representing at least double that of the previous value.

The step was a significant one, and now other shore communities along the lengthy Massachusetts coastline are considering adoption of a similar program. Such efforts, replacing more costly and archaic methods for eliminating predators in shellfisheries, should provide substantial impetus to a new market for aglime at many points along the nation's coasts.

2nd Qtr. Gypsum Production Shows Slight Decrease

Output of crude gypsum from domestic mines in the second quarter of 1961 was 5 percent below that in the corresponding quarter of 1960, according to a report from the U. S. Bureau of Mines. The apparent supply of crude gypsum for the quarter totaled 3,955,564 short tons; this included 2,498,966 tons mined and 1,456,598 tons imported—a 27 percent gain in imports over the preceding second quarter.

Production of calcined gypsum decreased 4 percent from the second quarter of 1960. Sales of uncalcined gypsum products dropped 8 percent below those of the same period in 1960. Industrial plasters dropped 8 percent, building plasters 13 percent, and gypsum board products 3 percent. Wallboard showed a gain of 1 percent, but all other board items declined.

Fredericksburg Sand and Gravel Co., Inc., near Fredericksburg, Va., formerly the Culpeper Sand Co., has begun operations at the 90-acre Kings Highway gravel pit leased from P. C. Goodloe & Son. E. S. Hawkins is president; and Wilfred L. Harris is manager and secretary-treasurer.

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Enter 136 on card, page 181

Progressive Kansas Plant

(*Concluded from page* 130)

grizzly flows to a spread table. An 8-mesh screen is installed on the spread table to separate sands over and under that size for separate subsequent flow.

Plus 8-mesh material is flumed to a 44-in. Eagle fine material washer—the minus ⅜-in. fraction from the first screen noted above also entering this flow when desired. Products of this screw are received on a 30-in. by 102-ft. radial stacker and placed on the appropriate piles of fine, medium, and coarse concrete sands.

Minus 8-mesh material passing the spread table flows to a double 32-ft. Eagle Iron Works scalping-classifying tank, with a 3-cell collecting - blending flume. Products from the tank flow to the fine material washer handling concrete sands, to a companion 44-in. Eagle screw, which processes the finer sands—mason's, fill, and grout—and to a sump. Some specialty products are reclaimed from the latter by front-end loader, as needed.

The fine sand screw washer discharges to a 24-in. by 92½-ft. Peerless stacker that supplies three stockpiles of finished products. In an accompanying photo it can be seen that the track for the fine sand stacker is elevated (about 20 ft.). This permits positioning the stacker to discharge into a receiving hopper mounted on a tall supporting structure. When the fill and mason's sand stockpiles are full, the stacker discharges into the receiving hopper; water is added, and the mixture flows back into the dredging pond.

All concrete sand stockpiles are placed over a concrete reclaiming tunnel equipped with a 24-in. by 200-ft. reclaiming conveyor. Finer sand stockpiles are positioned over another reclaiming tunnel that has a 30-in. by 185-ft. belt. The two tunnels were installed at right angles to each other so that the reclaiming belts could discharge to the same following conveyor.

The latter is a 30-in. by 92½-ft. radial unit that delivers products to truck-loading bins of concrete, mason's, and fill sands. Like five other units in the over-all operation, it is fitted with Gates Super HC V-belt drive. A Merrick belt scale is installed with the load-out stacker, and a pre-set counter on the weighing system cuts off the tunnel conveyors when a predetermined quantity of material has been delivered to a loading point.

In addition, the above stacker feeds a short conveyor mounted above the rail-loading point—the short belt discharging through a pair of chutes into underlying rail equipment. As many as 42 cars can be accommodated on the double track spur. A Hewitt-Robins car puller positions cars on either track in either direction, and can handle six cars at a time—one loaded and five empty.

Originally the rail-loading chutes underwent considerable wear from abrasion. The problem was corrected by fabricating the chutes of Gates RFP rubber-faced steel plate. Since the sides outlast the bottom about 3 to 1, they are made separately from the bottom, so that the latter may be replaced as necessary. Reportedly, chute life has been extended to 14 to 16 months.

Plant equipment is supplied with electric power generated on the property. This involves a pair of 100-kw. generators driven by Waukesha natural gas engines. Wash water is provided by a 6-in. high-pressure Gorman Rupp pump, which also services the bearings on the Eagle equipment. An 8-in. low-pressure Gorman Rupp unit provides water for the drainboard flushing pipes and bottom water inlets of the fine material washers, and also to the scalping-classifying tanks, as necessary.

Operations of the Superior Sand Co. installation are headed by Beryle Tolbert, superintendent. Top management includes H. D. Ritchie, president; J. P. Ritchie, vice-president; and D. Ritchie, treasurer.

Operation was slated to start on October 1 at the new plant of Northern Indiana Stone, Inc., near Rensselaer. Products will be agricultural limestone and crushed limestone, and peak production is expected to be at the rate of 300 t.p.h. Principal stockholders are the following officers: Richard A. Kruger, president; Eugene H. Warren, vice-president; and Francis E. McDonough, secretary-treasurer.

Enter 137 on card, page 181 →

Special report to users of Caterpillar D7, D8 and D9 Tractors:

CAT CATERPILLAR

Parts you can trust
...cost less per hour

New Piston and Ring Combination Cuts Oil Consumption 33-50% ...Lasts Hundreds of Hours Longer!

What makes it so different? Look at the two Caterpillar-made pistons. Notice in the new design that *both* compression rings are now deeply seated in grooved cast iron (indicated in yellow) instead of only the top ring. Since cast iron is able to resist groove "pound out," both compression rings are held firmly *longer* in the correct position for maximum ring-to-liner sealing. Compression loss and blow-by *behind* rings and around grooves is delayed hundreds of hours, too.

The new intermediate compression ring is a "twist" ring, so-called because it changes position in the groove during the power stroke. It actually "twists" so its face has *greater sealing area* at the liner than regular rings—reducing the number of compression rings normally required. At the same time, it thins the film of oil left by the regular oil control ring. This leaves less oil to burn away which contributes to the new piston's better oil control and longer ring life.

All rings now have a new look, too . . . *each and every* face is thickly chrome plated against wear. They are also "bright lapped" to such brilliance that any flaws can be easily seen and the faulty ring rejected. Such quality control assures almost perfect seating right from the start, eliminating break-in blow-by, slobbering and scuffing.

Cost? Pistons with the *extra* cast iron bands cost *slightly more*, but ring sets are less! Once you change over, your tractor maintains its power longer, your fuel and oil bills go down, and your next set of replacement rings will be less. Your Caterpillar Dealer has them in stock now.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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DUAL-PURPOSE PLANT A VERSATILE OPERATION

• Marketing scope broadened with combination crushed stone, sand and gravel production facility

By BUREN C. HEROD

The heart of the operation. This compact layout incorporates every processing phase except primary crushing. It includes scalping, secondary and tertiary reduction, finish screening, and classifying.

ANOTHER ON THE SPOT report

NOW in its third operating season, the new combination plant of P. J. Keating Co., Lunenburg, Mass., represents a far-sighted broadening in the scope of operations that permits the firm to offer a complete package to the road construction market. In replacing an obsolescent sand and gravel plant, the new installation handles not only that type of material but also crushed stone.

The latter factor is particularly significant in view of the fact that the firm can now supply its two bituminous concrete plants with crushed aggregates that formerly were purchased. A steady supply is assured, and road construction projects can be supplied with everything from stabilized base material through simple crushed or uncrushed aggregate to ready-mixed and bituminous concretes. Completing the "package" from production to utilization are the firm's own paving crews that handle the company's road work contracts.

Built around a basic design developed by P. Warren Keating, president, the 400-t.p.h. plant was fabricated by Eastern Engineering Sales Co., Quincy, Mass., and was erected by the Keating crew. Basic objectives met in the design were compactness, ease of operation, and flexibility of production.

Planning of the new operation was accompanied by a search for suitable reserves to supply the crushed stone production requirements. The sand-and-gravel deposit on which the older plant was situated is adequate to supply those materials to the new operation which was built in another area on the same property.

An exposure of trap rock suitable for quality aggregate production is located about ½ mile east of the plant site. Drilling and blasting of the rock are done under contract. However, a Keating crew runs the 2-cu. yd. P&H quarry shovel, and the four Euclid trucks which feed the primary crusher.

Primary reduction of rock is handled by an Allis-Chalmers 12C gyratory crusher that delivers a minus 6-in. product. The latter is received on a 36-in belt and conveyed to a

The new P. J. Keating plant was designed to handle either crushed stone or sand and gravel feed. This view was taken prior to the installation of crusher-run surge bins that supply the main plant feed belt, foreground, with material that has been put through the primary stone crusher. The gravel crusher is below the sand and gravel truck dump hopper, left.

pair of 200-ton surge bins. Crusher-run material is drawn from these bins by a 36-in. reciprocating plate feeder and placed on the main plant feed belt, conveyor No. 1.

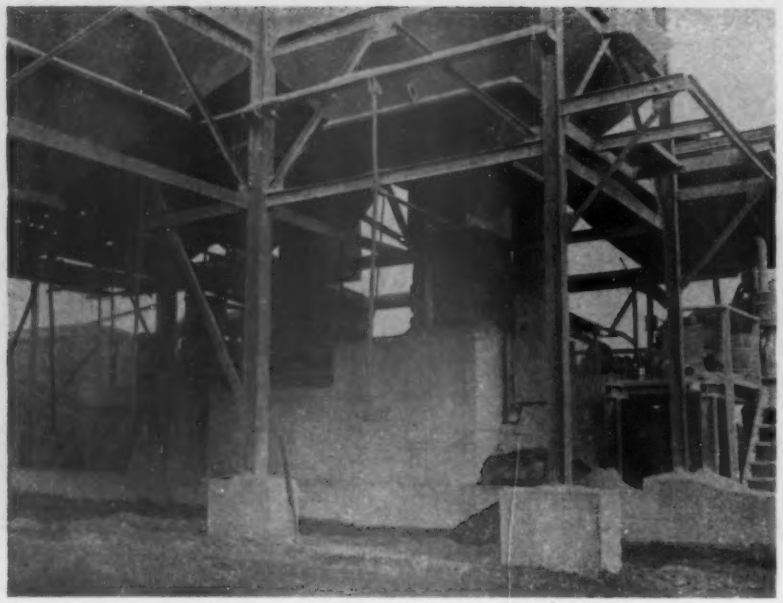
When sand and gravel are being processed, pit trucks dump from a hillside ramp into a feed hopper, from which the materials are removed by a Syntron grizzly feeder. Throughs from the feeder flow directly to conveyor No. 1. The oversize is delivered into a 2036 Pioneer jaw crusher, and the crushed gravel is also discharged onto that conveyor. Either type of feed is transported on the 30-in. by 126-ft. belt to the main plant section.

The compactness of the plant design is evident in the fact that the main section incorporates the scalping, secondary and tertiary reduction, finish screening, and classifying phases, with all related equipment. The efficient physical setup is paralleled by a high degree of processing flexibility. Excepting the reduction units, all equipment is mounted above a set of seven 50-ton loading bins.

In the first phase, the plant feed is discharged to a 5- by 10-ft. double-deck Allis-Chalmers scalper. This screen has 2½-in. openings on the top deck, the lower deck being split with 1¼- and ⅜-in. opening sections. (*Turn page*)

A closeup of the gravel crushing and feeding installation. A vibrating grizzly feeder delivers oversize to the jaw. Crusher product and grizzly throughs are received on the main feed belt, foreground.

Crusher-run from the secondary breakers may be placed in the bin at the left. When the bin is full, the system automatically places the material on the return belt, upper center, for delivery to the finishing screens. The main plant feed belt is at the right.



Secondary reduction is handled by the two crushers, center. These units are driven by diesel engines. To the left, partly hidden, is the tertiary crusher. All other equipment is mounted above the 50-ton truck-loading bins.

A part of the top deck fraction may be chuted to a 1051 A-C Hydrocone, normally set for ¾ in.; a part may be chuted to an adjacent 36-in. Telsmith Gyrasphere which is set for ⅜ in.; and the balance bypasses secondary crushing and is chuted to conveyor No. 2. The latter belt, 30 in. wide and 131 ft. o.c., also receives the products of secondary reduction and transports these materials to a transfer point above a crusher-run bin.

The above system permits blending of crusher run material in accordance with the proportion of fines desired, which is controlled by the crusher used or by the amount of material delivered to each. Crusher-run may be discharged at the transfer point into the underlying crusher-run bin, or it may be placed on 30-in. by 123-ft. conveyor No. 3 and returned to the main plant for finish screening. Actually, when the crusher-run bin is full, the supply chute is automatically closed to permit the material to flow to the return belt.

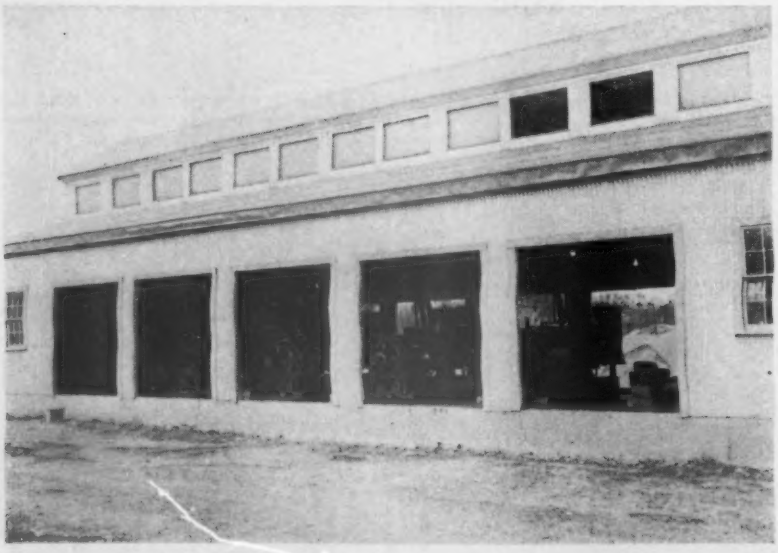
Depending on the condition of the plant feed, either one or both of the sections of the scalper's bottom deck may be open. When both are open, the minus ¼-in. fraction may be chuted alone into one of the underlying bins, the minus ⅜-in. stone may drop to another bin, or the two may be chuted together to another bin. All materials retained on the bottom deck of the scalper follow the bypass noted previously and are carried on No. 2 conveyor to the transfer point over the crusher-run bin.

Both crushers described above, and the tertiary unit noted below, are fed through step chutes. Also, all screen chutes have lengths of angle iron welded across the bottom surface. In both instances, the objective was reduced maintenance through having material in flow wear on the material lining the chutes instead of the chute metal itself.

Finish screening is initiated with the material carried on No. 3 conveyor being discharged to the top finishing screen. A 5- by 14-ft. triple-deck A-C unit, this screen is fitted with screencloth of 2¼-, 1⅜-, and ¾-in. openings on the top, middle, and bottom decks, respectively.

The top-deck retained fraction is chuted to the 1061 Hydrocone for further reduction, and the two fractions retained on the middle and bottom decks are chuted to the appropriate underlying bins. Bottom deck throughs flow to the lower final screen.

This unit, also a triple-deck A-C screen, 5- by 16-ft., makes separation on 9/16-, 7/16-, and 3/16-in. opening cloth (top to bottom). Except in the case of sand and gravel production, all fractions may be individually chuted to their respective



Electric power for the over-all operation, except the secondary crushers, is provided from this generating plant. Current is generated in 200-kw. generators driven by twin diesels, and is delivered at 440 v.

bins, or they may be be blended *via* flop gates as discharged to a selected bin.

When natural sand is involved, and certain future additions have been made, the bottom deck throughs from the final screen will be delivered to a sand drag. Finished "wet" sand from that unit will be placed on a stockpiling conveyor, and dry sand will be carried to stockpile on another belt.

Augmenting the production of finer fractions in the flow already described is a third system in which larger sizes of stone may be drawn from three of the bins and conveyed to an Allis-Chalmers 222 gyratory. This crusher is choke-fed, and any over-flow, along with the crusher product, is placed on the No. 2 belt leading to the crusher-run bin.

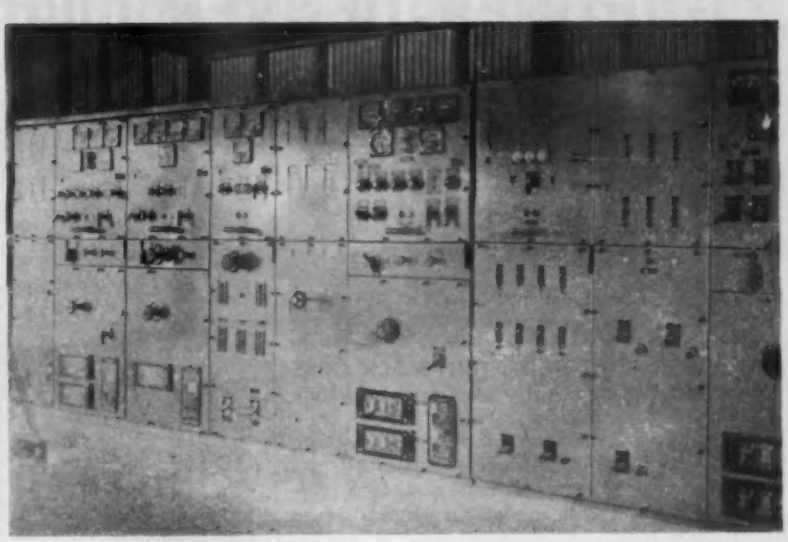
In addition to the sands, the basic products of the operation include crusher-run; stabilized road base to virtually any desired blend; six aggregates in the range of 2¼-in. to dust; plus blends of ¾- and 1⅜-in. fractions for base materials and of ¾ with ⅜ × O. The ¾ and ⅜ × O products are used extensively in the Hetherington & Berner and F. D. Cummer 2½-ton batch hot-mix plants.

Electric power for the over-all operation and equipment, except the two secondary crushers, is provided by the firm's own generating plant. This is comprised of four twin GMC diesels with 200-kw. G-E generators, and switchgear panel. Power is delivered at 440 v. to the electric motors of the plant equipment. The two secondary crushers, however, are driven by a twin 671 "Jimmy" diesel.

To assure that the productive efficiency is complemented by peak service, the company operates a radio-controlled fleet of 25 trucks. From the base station at the plant office, radio contact is maintained with RCA mobile units installed in ready-mix trucks, supervisors' cars, and utility vehicles. Some shipments are made by rail, but the majority are handled by truck, primarily in Keating equipment, to customers within a 25-mile radius.

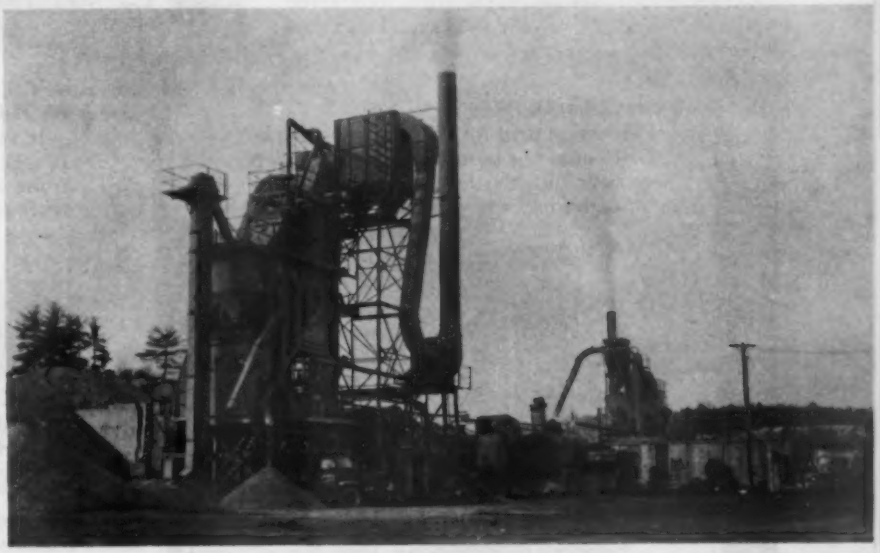
The versatile new operation represents another significant forward step for the 40-year old firm. Founded by Paul J. Keating about 1920 as a contracting company, it was expanded in 1931 to include aggregate production. In the late 1930's ready-mix and bituminous concrete were added. At the end of World War II the 125-t.p.h. sand-and-gravel plant which the new installation replaces, was built.

Management is headed by P. Warren Keating, president; and Robert Keating, vice-president. Reuben Landry is general superintendent of all operations, and Charles Sanderson is in charge of the aggregate plants.



The switchgear panel in the generating plant.

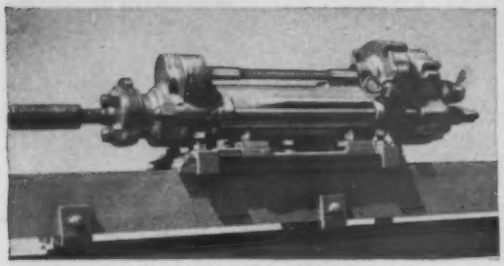
Hot-mix bituminous concrete is produced in these two plants, which are now supplied with crushed aggregates from the new operation. The firm also produces ready mixed concrete, and with all these activities can offer a full road building package from base material to finished surface.



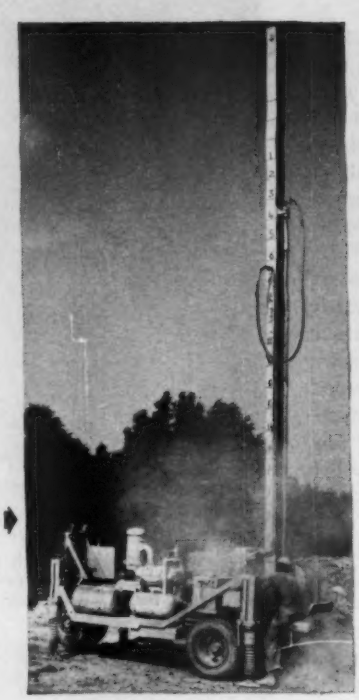
The new plant of the Mohawk Sand and Gravel Company, on the Arkansas River near Cleveland, Okla., went into production recently. This operation has a capacity of 150 tons of graded sand per hour.

Installation of a plant for the manufacture of bituminous concrete paving materials at Fulton, N. Y., has been announced by Allied Chemical Corporation's Barrett Division, Syracuse, N. Y.

GARDNER-DENVER quarry equipment



NEW PR123 POWER-ROTATION ROCK DRILL Provides absolute control—new Gardner-Denver PR123 has independent rotation control . . . variable forward speed, variable reverse speed, plus neutral position. Now driller can select right combination of rotation, drill impact, feed pressure and hole blowing for fastest penetration in any type of rock.

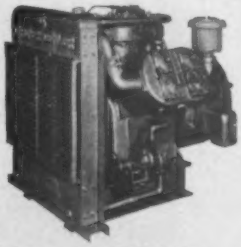


NEW ZEPHYR ROTARY BLAST-HOLE RIG. For fastest drag bit operations—the new Zephyr is a self-propelled, self-contained rig designed for one-man operation. It features 10,000 lbs. pull-down pressure on bit, instantaneous travel control, heavy-duty rotary table with four speed options; and a 200 cfm air package. Track and wheel models. Hole sizes from 1¾″ to 4½″.

SWING-BOOM "AIR TRAC"® Most versatile crawler drill available—boom swings in arc of 11′10″ . . . reaches 2½′ over both sides of tracks. For horizontal holes, mast reaches 9′6″ above floor. Swing-boom "Air Trac" is self-equalizing, self-stabilizing . . . moves quickly and easily over rough, rocky terrain. Drill rod change to 20′.

"MOLE-DRIL"* Percussion drill for rotary rigs—"Mole-Dril" cuts big bore hole in hardest formations quickly. Drill follows bit down through rock, screws on end of drill pipe.

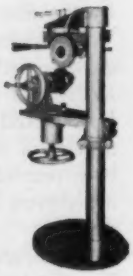
*T. M.



W-TYPE COMPRESSORS. A water-cooled work horse—here's a stationary compressor that installs easily, runs smoothly and requires little maintenance. Models in capacities from 143 to 1395 cfm.

BROACHING DRILLS. Three heavy-duty models—have interchangeable chucks for drilling and broaching. Drill wet or dry. Feeds available from 7′2″ to 13′4″. Mounting slide provided with gibs and removable shims.

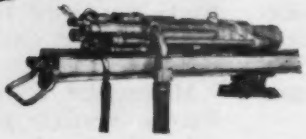
BREAKERS Rugged, hit hard—a size and weight for every requirement.



BIT GRINDERS Fast, efficient—sharpen full range of cross and X-type bits.

AIR FEED LEG DRILLS Lightweight, easy to use—two bore sizes, 2½″ and 2⅝″.

DRIFTERS Automatic and continuous-feed models—bore sizes from 2¾″ to 4″. Deep hole drills available in bore sizes of 4″, 4½″ and 5½″.

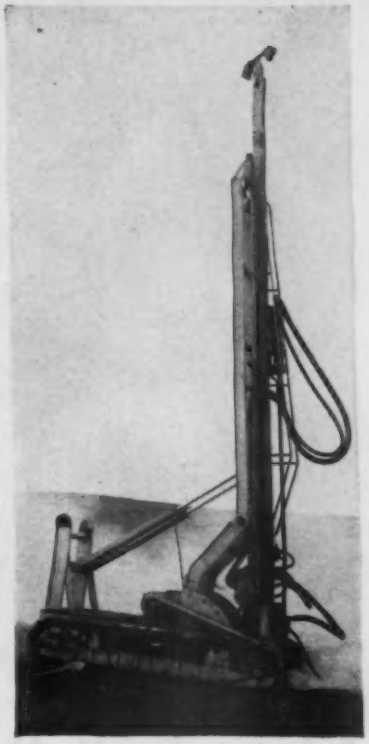


SINKER DRILLS Speed secondary breakage—five models, 2⅜″ to 2¾″ bore.

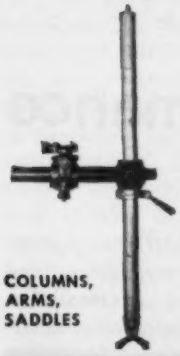
to help you produce more at less cost

NEW ROTA-SCREW PORTABLE AIR COMPRESSORS. Reduce maintenance to a trifle—new-type rotary screw compressor has no touching parts in compressor chamber . . . no blades to inspect or replace. It delivers pulsation-free, compressed air flow almost instantly on start-up. Rota-Screw portables operate off level . . . operate in all weather, 40° below to 115° above zero. Three sizes: SP900, 900 cfm; SP600, 600 cfm; SP125, 125 cfm.

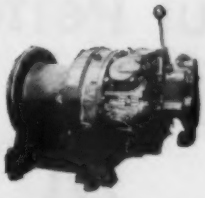
NEW HI-LEED DRILL STEEL. Never before drill steel like this—HI-LEED steel is designed to always uncouple by hand. It combines field-proven reverse buttress design with entirely new thread form that eliminates the wrench.



HT143 CRAWLER ROCK DRILL. Takes a rod change to 30′—Gardner-Denver HT143 carries a hard-hitting, 5½″-deep hole drill on a heavy-duty drilling mast. It is self-propelled. All controls centralized for ease of operation.



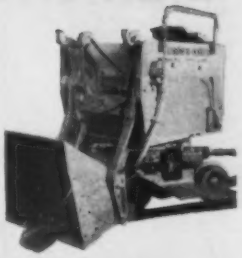
COLUMNS, ARMS, SADDLES



AIR HOISTS

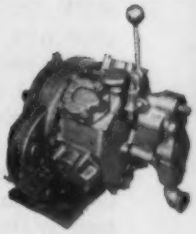
SUMP PUMPS

DRILL STEEL FORGES



MINE CAR LOADERS

IMPACT WRENCHES



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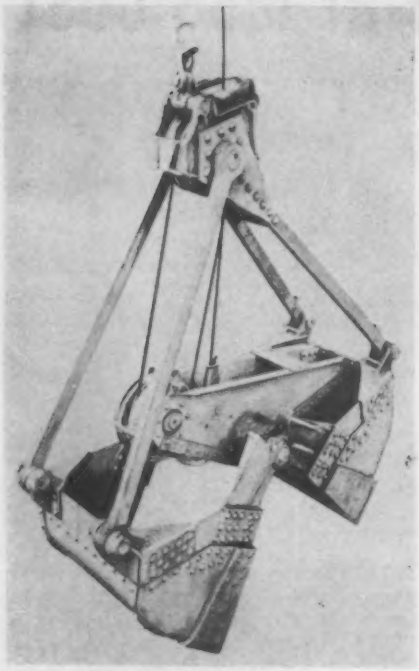
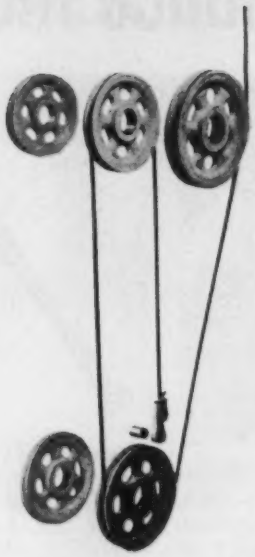
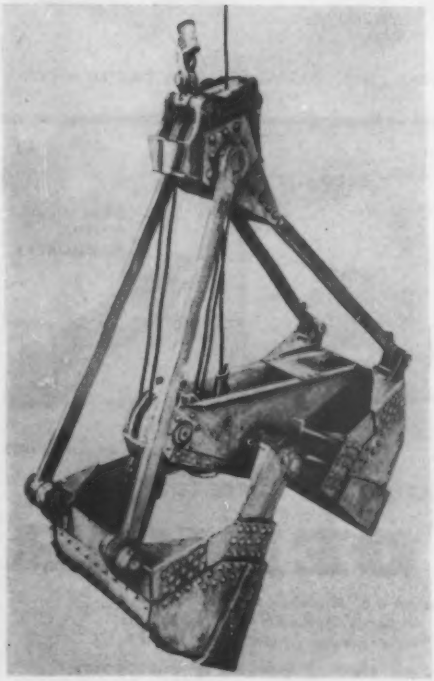


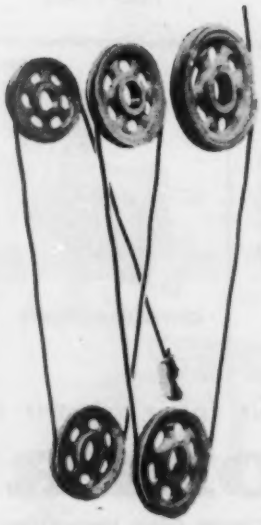


An illustration of three-part reeving. In certain instances, bucket reeving must be kept at the minimum to avoid multiplication of closing forces which can damage the bucket elements. In another area, prolonged cable life will result if closing cable of the correct diameter is fitted to bucket sheave grooves.

By C. J. POLINEK*

Clamshell Bucket Care— Key to Successful Performance

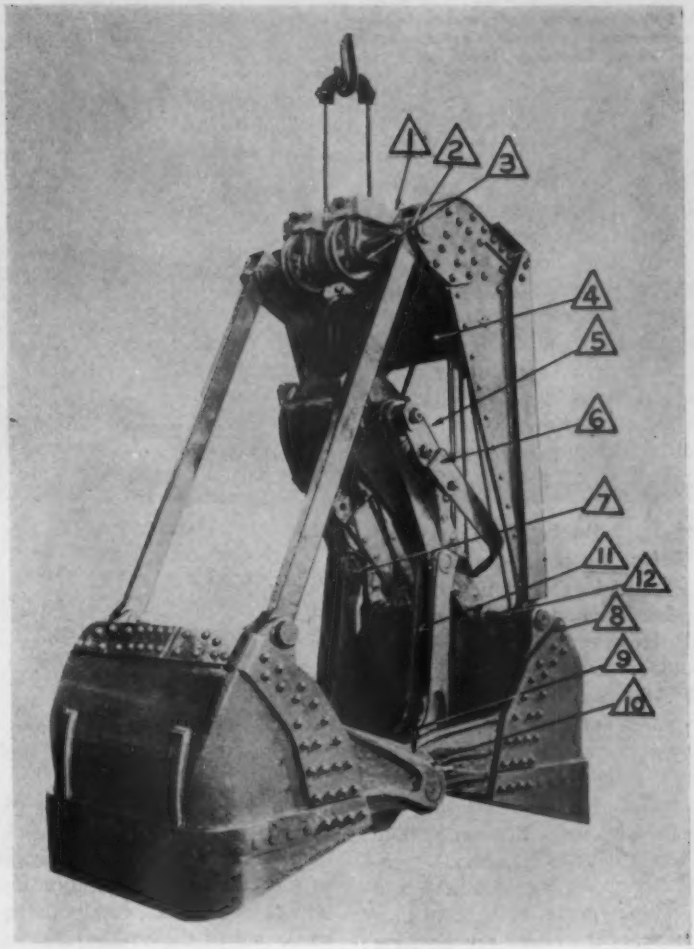




MAINTENANCE — preventive and periodic — and proper use are essential to the successful performance of clamshell buckets. Designed to dredge muck, clay, sand and gravel, shale, coral rock, and blasted rock, these buckets also are employed to handle municipal refuse, tetraethyl sludge, acid phosphate, granulated slag, open hearth slag, limestone, and coal. They are also used in many other applications. More often than not, these buckets are operated under the most difficult of conditions. They are

*Product sales manager, buckets, Blaw-Knox Company.

Five-part reeving. In addition to proper reeving for most efficient digging, bucket operating efficiency and life is increased through cable lubrication, proper counterweighting, avoidance of opening shock, correct operating techniques, and regular maintenance and inspection of bucket components.



Thorough and regular lubrication is important to offset the abrasive nature of most materials handled. Various points of lubrication include: (1) upper guide rollers; (2) lower guide rollers; (3) guide sheaves; (4) upper block sheaves; (5) lower block sheaves; (6) trip lever roller; (7) elbow pins; (8) corner pins; (9) lower folding arm; (10) inside hinges; (11) dead-end sockets; (12) radius bar bushings (for a closed head single line bucket).

subjected to grit, abrasion, corrosion, strain, overloading, and other general abuse.

Although clamshell buckets represent a relatively minor part of the total crane-bucket investment combination, they are controlling units in performance, efficiency, and yield. The fabricators of buckets are responsible for providing the best possible tools for operation within design specifications. The *users* must assume responsibility for proper application of buckets to jobs, as well as for maintenance.

Where does this responsibility begin—particularly with maintenance?

Competent and experienced workmen are musts for bucket maintenance, and proper parts are musts when replacement is necessary. Repair men in shops, inexperienced in bucket operation, often use the improper size or type of material; they may assemble parts of different models and/or makes. Such practices usually result in "mongrel" buckets that fail early or are restricted in performance.

To guard against "mongrel" buckets and to ensure proper use, maintenance, and care, clamshell bucket users should become more familiar with all parts and operations—particularly the following:

1. Lips—welding
2. Cable
3. Teeth, bolts, etc.
4. Counterweights
5. Lever-arm sheave assembly
6. Avoiding opening shock
7. Reeving
8. Lubrication

Lips—Welding Bucket lips bow in only from improper operation or abuse, and they bend out when work is too severe for a given weight and type of bucket, as well as from certain kinds of faulty operation. When a bucket lands on material in a wide open position, lips are vertical, and there is no tendency to bow in. Bending out, or lip breakage, can be avoided by reducing the number of internal reeving parts of the closing line.

Welding technique varies according to bucket lip material, which includes high-carbon rolled-steel plate lips on which cutting edges are hardened by quenching; heat-treated cast chrome-nickel molybdenum alloy steel lips with cutting edges specially heat-treated for additional hardness; rolled alloy steel plate lips or abrasion-resisting rolled steel plate lips in mill condition; and cast manganese steel lips in foundry condition. Different welding techniques are required for each lip material, regardless of whether cutting edges are being rebuilt or hard-surfaced, or whether service-developed cracks are being repaired.

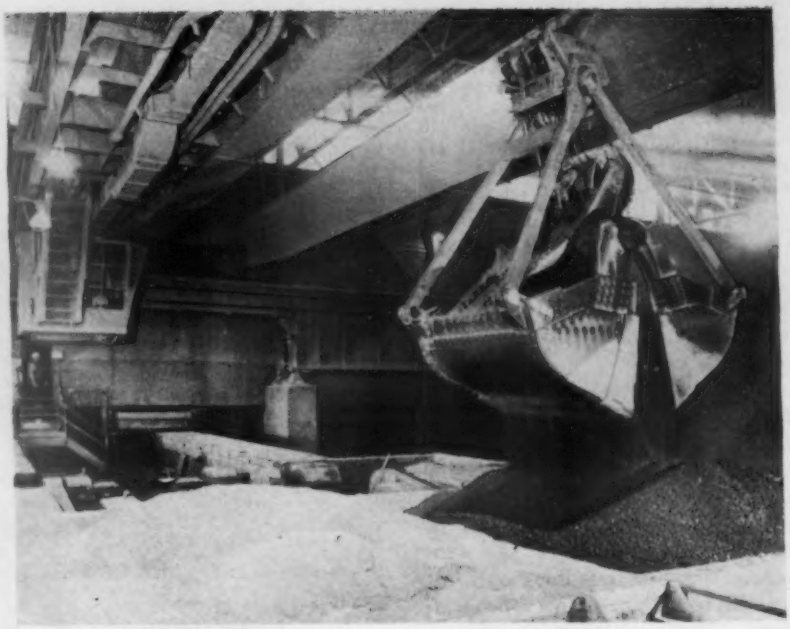
Cable To prolong cable life, closing cable of correct diameter should be fitted to bucket sheave grooves. Sheaves free from groove and flange defects prevent cable damage, and periodic checking of sheaves assures free rotation.

Guide rollers at the bucket head should be checked for free rotation, and should be replaced promptly when surfaces become grooved or acquire flat spots from cable contact.

Proper lubrication also adds to cable life by resisting corrosion on individual external wires and internal wires of cable strands. In addition, lubrication preserves the hemp center supporting the cable strands.

Since the greatest amount of cable wear usually takes place in the closing cable section entering the bucket head, cable cut in sufficient lengths

A properly maintained clamshell bucket in operation at a cement installation used for placing materials in a mill feed hopper.



utilizes all of the scoring on the closing drum of the crane or hoist. As the cable becomes worn and frayed, the point of maximum wear can be shifted by pulling the worn portion through the bucket without totally unreeving the cable from the drum. Several shifts can often be made, after which the cable is sometimes switched end-for-end—using in the bucket the part that was originally on the drum.

Teeth and Bolts Bucket teeth are usually chisel-shaped, drop-forged from high-quality, heat-treated, chrome-nickel steel. However, when large rocks or boulders are encountered, short, stubby teeth are more practical. Excessive abrasion results in early wear and blunt cutting edges. Teeth must be kept sharp because worn, blunt teeth reduce digging efficiency.

Teeth are most often secured to scoops and lips with special high-tensile steel bolts, lock washers, and nuts. These special bolts, considerably stronger than ordinary machine bolts, are keyed at the head and fit into a keyway in scoops and lips to prevent turning.

Counterweights Center counterweights increase the opening power or speed of the bucket. Light or heavy counterweights are used only to obtain sufficient opening power, as operating conditions require. Excessive counterweighting reduces the ratio between pay load and dead weight.

Scoop counterweights are used for greater digging power when excessive resistance is encountered to scoop penetration. In addition, these counterweight plates add strength to the lips and the entire scoop structure.

Lever Arm Sheave Assembly Felt seals in the lever arm sheave assembly should be replaced at least once during every 12 months of normal operation, and once every six months during underwater operation. Excessive leakage of lubricant past the felt seals reveals a need for seal replacement.

Retention of the outer race of one bearing in position against the shoulder of the sheave is necessary to prevent sheave separation during bucket operation. Tap bolts at the small end of the headed sheave pin should be pulled tight to prevent the sand seal rings, spacers, and inner races of ball bearings from rotating on the sheave pin.

Avoiding Opening Shock To avoid opening shock, adjustment of the dead-end point will prevent hinge stop impact during dumping. Continual shock, resulting from an improper adjustment, ultimately leads to crystallization and breakage of main hinges. Hinge stops are intended only to limit open spread of scoops when the bucket is set "down"—by tripping the opening in the air, or automatic opening at the set-down point. Regardless of the adjustment — screw or pivot—it must insure 90 to 95 percent full opening of scoops during dumping.

The dead-end point is where the closing cables are fastened to the dead-end pin in its bracket, either by cable clamps or by cable sockets and wedges.

For screw adjustment, the dead-end bracket has either one or two slots—depending on the size of the bucket. When the dead-end bracket is adjusted properly, scoops are retarded just enough to swing open through minimum leverage in closing line tension. This tension is increased when the hinge stops strike. Tension is reduced when the scoops fail to open wide enough.

In pivot adjustment, the bracket is pivoted on the corner pin axis to be rotated downward to increase tension, or upward to reduce tension.

When adjustment has been completed, bolts are employed to hold the dead-end bracket in a fixed position.

As a general rule, dead-end adjustment for a new bucket is set to obtain less snubbing action than for a bucket that is "worn in." A check should be made of a new bucket after a few days of service; and if hinge stops are striking, snubbing force should be increased just enough to prevent hinge stop impact.

Reeving Reeving may be varied to provide adequate digging and maximum operational speed. Some materials are easier to dig than others because of less resistance to penetration. Therefore, when a bucket is employed to dig an overflow load, reeving is reduced to obtain maximum closing and

(*Concluded on page* 149)

You'll be getting a machine that can bulldoze, do "carry-type scraper" and grader work—and can give you power-shovel-like, pry-over-shoe break-out force for tough digging. This TD-9 Four-in-One is punching a hole into a West Virginia hill—for punch mining a 5' to 7' coal seam. Note that the operator gets full-sized, full-capacity, depth-controlled bulldozer action!

Only 4-in-1's take over for a whole "equipment spread"

Figure the thousands of dollars ahead you'll be by letting one International Drott Four-in-One take over for several specialized rigs. *One machine (with uses unlimited)—one investment—one operator.* That's streamlining for profit!

Dial your International Drott Distributor for a demonstration of a Four-in-One today!

International Harvester Company, Chicago 1, Illinois
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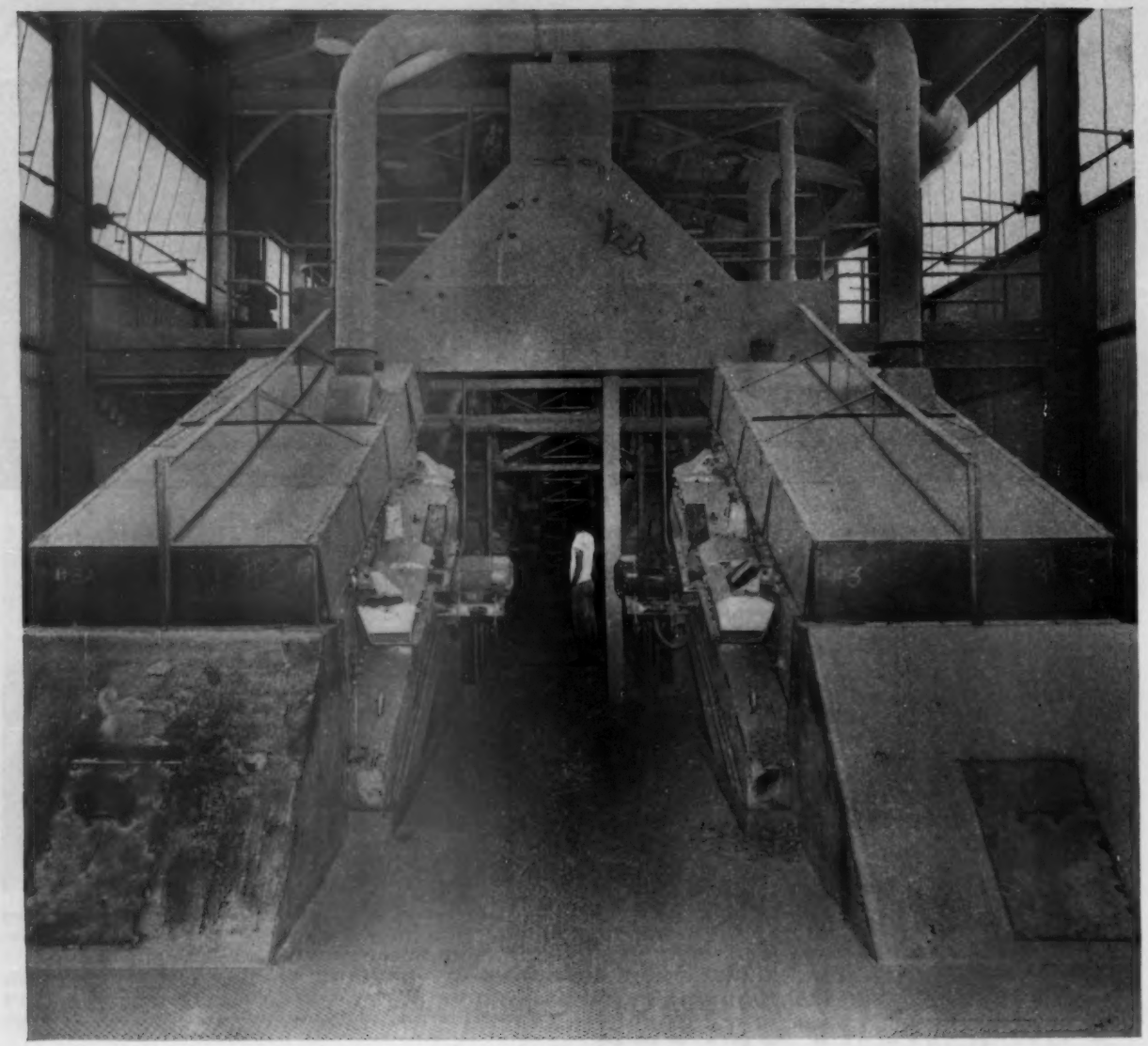
INTERNATIONAL® DROTT®

You'll profit from positive clamshell bottom dumping—to handle all types of materials, in all kinds of conditions, even where obsolete buckets fizzle out. This fast-working TD-15 Four-in-One is saving an hour a day in bucket clean-out time, loading sticky clay. Opening the Four-in-One's clam pulls material from bucket surfaces; gravity down-pull assures prompt self-cleanout!

You'll clam-on to anything you want to move and handle it fast! This TD-9 Four-in-One clam-handling a tree does all the land-clearing and load-out work at a pit producing bank gravel. This "bucket with the bite" easily grabs, carries, and loads stumps, boulders, and other "impossibles"—with the "man in the seat" in full charge!



"NO REPAIRS SINCE INSTALLATION" FOR THESE HIGH-CAPACITY TY-ROCK SCREENS

This group of five 5′ x 14′ F-600 Ty-Rock screens is used on final sizing at the Bogota, New Jersey, plant of Geo. M. Brewster and Son, Inc., where the company processes crushed stone for the spectacular George Washington Bridge conversion project. Their superintendent reports "There have been absolutely no mechanical repairs of any kind—only normal replacement of parts and screen cloth sections in contact with stone." This is another application where Tyler screens handle tremendous outputs with very high reliability. Check Tyler for a full range of vibrating screens for all types of requirements.

MAN WITH 50,000 SAMPLES

Tyler field engineers can carry only a representative group of wire cloth samples—but they are backed by over 50,000 specifications in different types, sizes, metals, meshes, and designs. Tyler produces world's broadest line of wire cloth—your assurance of unbiased recommendations and exact matching to your needs.

TYLER CUTS YOUR COST OF SCREENING • Requirements matched from world's broadest line of wire cloth • Fast shipments from the industry's largest inventory • Technical service backed by unique Customer Service Laboratory.

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Clamshell Bucket Care

(*Concluded from page* 146)

opening speed while maintaining capacity loads. If a bucket closing cable is not reeved to the maximum number of parts and the bucket is not digging a full load, digging efficiency improves if the number of parts of line in the bucket is increased.

In handling large chunks of noncrushable material, which prevents the bucket from closing fully, all the closing force usually is applied between the tips of the teeth or on one corner or side of the bucket. This causes unusually severe twisting strains in the scoop and hinge assembly and in the corner bar structure. Unless reeving is reduced to two (three, at most) parts, particularly if rock is embedded, the multiplication of bucket closing forces becomes so great that breakage of teeth, lips, or bucket structure often occurs.

Lubrication Thorough and regular lubrication is important because of the abrasive nature of most materials handled.

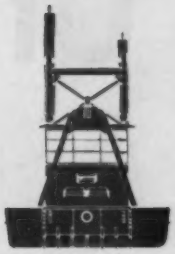
When a new bucket is first installed, it should be lubricated at least twice during the course of a usual work shift. Since bearings are shop-fitted and have close tolerances, an adequate film of lubricant at all times assists in wearing in smoothly, without danger of seizing and galling on the shaft. Regular lubrication at the beginning of each work shift is usually sufficient when bearings are thoroughly worn in.

Particular attention must be given lever arm sheaves, including daily coverage with an anti-friction bearing lubricant.

Other parts requiring regular lubrication include the following: upper and lower guide rollers; guide, head, upper block, and lower block sheaves; trip lever roller; elbow and corner pins; lower folding arm; lever arm sheave bearings; lever arm dead-end socket; inside hinges; dead-end sockets; corner, main hinge, and radius bar bushings; and hold line knuckle.

When the bucket operates in areas of considerable heat, more frequent lubrication is necessary. Good lubrication often accounts for as much as a 50 percent difference in proper bucket operation.

AT LONG LAST
A REAL
SAND & GRAVEL
DREDGE



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THE ALL NEW PORTABLE
SD-110

This amazing 10" dredge will dig anything but solid rock!
The most efficient dredge ever produced . . .
designed to give years of trouble-free service.
It's rugged and it's right!

EXCLUSIVE SD-110 FEATURES

- CONFORMS TO HIGHWAY LIMITATIONS
- GUARANTEED UNBREAKABLE CUTTER SHAFT
- EXTENDABLE HULL FOR WIDE SWEEPS
- 2 HOUR ASSEMBLY AND LAUNCHING
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- EXCLUSIVE PATENTED HYDRAULIC CUTTERDRIVE
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OUTLETS — DMC products sold and serviced by distributor outlets throughout the world

FIRST NAME FOR DREDGES

Enter 149 on card, page 181

Union Wire Rope

When the going gets tough--Tuffy gets going,

Victim of the Bends

Excessive bending of wire rope accelerates wear. Generally, more flexible ropes are used as bending stresses increase (with decrease in tread diameter of sheave or drum). If a rope is operated on a sheave too small for its bending characteristics, early failure is certain. Through an exhaustive series of bending tests, Union Wire Rope engineers have compiled data that you can use to assure getting the rope construction that will give you the longest service life. Ask about it.

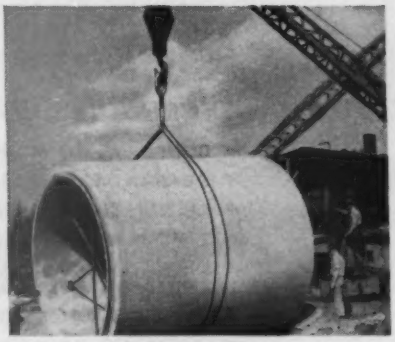
Kick Out Worn Sheaves

Old sheaves may never die, but in "fading away" they develop conditions which shorten rope life. Sheaves with grooves corrugated with rope lay impressions should be replaced with new ones before new wire rope is installed.

Union Tuffy's on these jobs give you the ultimate low cost.

Tuffy Scraper Rope

Flexible enough to take sharp bends; stiff enough to resist looping and kinking when slack; highly resistant to the shock of load impact — that's Tuffy balanced construction. Mount a reel on your scraper—save wasting sound rope.



Tuffy Slings and Hoist Lines

Slings are a patented, 9-part machine-braided wire fabric that is next to impossible to knot or kink. Hoist lines have built-in strength, toughness, flexibility. Balanced—a top-performing team for handling every type of material. In addition to Tuffy, Union Wire Rope furnishes a complete line of slings.

Tuffy Dozer Rope

Mounts right on your dozer in a 150′ reel. When rope shows wear, just feed through enough to replace the damaged part. Saves rope, gives you a bonus of extra service. Also available in 300′ and 500′ reels.

The Union Wire Rope Organization Gives You . . . RIGHT-NOW service with the RIGHT rope. Get set for quick action. Vast Union Wire Rope facilities assure fast delivery of just the wire rope or sling you need. More than 1600 standard constructions are available *plus* the famous Tuffy family of ropes and slings tailored to special needs. Hundreds of distributors and 15 strategically located warehouses help you meet emergencies—cut wasteful down-time. Call your Union distributor. He's listed in the phone book Yellow Pages.

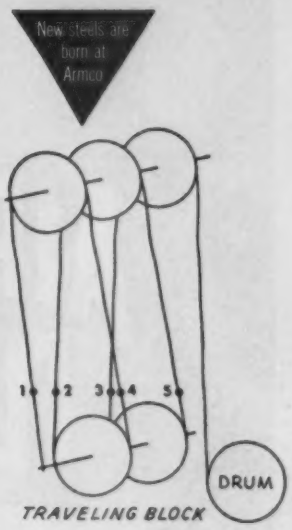
Tuffy Tips

and keeps going longer if not abused

Diameter of Rope	Min. Dia.	Max. Dia.
¼ - 5/16	+ 1/64"	+ 1/32"
5/16 - ¾	+ 1/32"	+ 1/16"
7/16 - 1⅛	+ 3/64"	+ 3/32"
1¼ - 1½	+ 1/16"	+ 1/8"
1⅝ - 2¼	+ 3/32"	+ 3/16"
2⅜ and larger	+ 1/8"	+ ¼"

Recommended groove sizes:

New ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as (above) charted.



How to Figure Reeving Loads

Reeving ropes through the sheaves multiplies the number of parts supporting the load. The lead line to the drum carries the weight of the load lifted, divided by the number of parts, plus the accumulation of friction on all sheaves.

To count the number of parts supporting the load, draw an imaginary line across the parts of the rope supporting the load.

The efficiency of reeving systems ranging from one to eight parts is shown in charts which Union Wire Rope engineers make available to users.

Tuffy Dragline Rope

High abrasive resistance and super flexibility. Gives long service, dependable action in handling any material—wet or dry dirt, sand, gravel, rock, minerals. Rides smoothly on grooves—hugs the drum when casting for full load.

Union's Handbook of TUFFY TIPS—Free!

The "Tuffy Tips" shown here are quoted right out of Union Wire Rope's handbook. In it there are dozens of other priceless hints on the correct use of wire rope. The common abuses and how to avoid them. How to save costly injuries. Maintenance tips. The proper fittings and how to apply them. Recommended sizes. Many other facts and suggestions that will cut down your rope costs and help you get out of wire rope the full service we build into it. No charge. Write Union Wire Rope, Armco Steel Corporation, 2132 Manchester Avenue, Kansas City 26, Missouri.

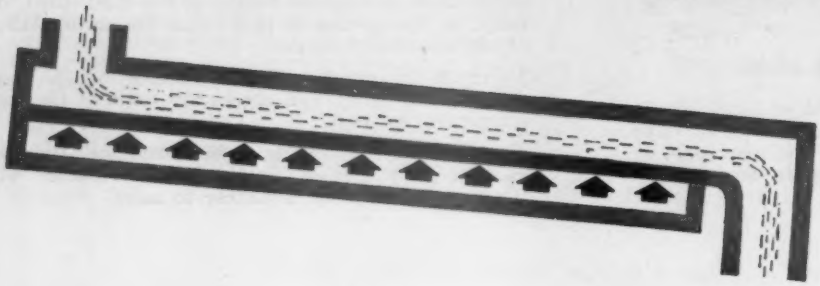
4-61

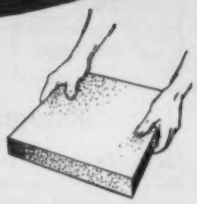
ARMCO Union Wire Rope

KENNEDY

AIR FLOAT

the better-built, more efficient air-gravity conveyor provides the answers to Dry Solids Conveying





The special porous plate is exclusive with KENNEDY AIR-FLOAT. It is strong, resistant to abrasion and temperature and has a smooth surface texture.

Sections are ruggedly designed, formed on modern production equipment and completely assembled before shipment.

Q. How does AIR-FLOAT work?

A. *The dry material to be conveyed is fed on to a smooth, rigid, porous plate through which low pressure air continuously diffuses. Because the conveyor is inclined about 6 to 8°, the aerated material flows by gravity.*

Q. What distinguishes the KENNEDY AIR-FLOAT from other air-gravity conveyors?

A. *Primarily, the special porous plate. Also the casing is of heavier construction, flanged and channeled for greater rigidity.*

Q. How is this special plate better than other porous media?

A. *The AIR-FLOAT porous plate has literally millions of tiny pores through which the air diffuses uniformly for thorough aeration of the conveyed material. The plate is thicker, stronger, temperature- and wear-resistant, and has a very smooth surface texture.*

Q. How does this improve conveying?

A. *AIR-FLOAT has a much higher capacity than competitive air-gravity conveyors. Blind spots are eliminated and the angle of inclination is less critical.*

Q. What about maintenance?

A. *The KENNEDY AIR-FLOAT is the nearest thing to a completely maintenance-free conveyor that has ever been devised.*

Q. Can turns be made?

A. *Direction changes up to 45° are made with standard pieces. These can be combined for greater angles.*

Q. Are accessories available?

A. *Yes. End and side discharge boxes, splitters, control gates, transitions, bin extractors and required blowers can be provided.*

Q. Have KENNEDY AIR-FLOAT Conveyors been fully tested and proven?

A. *Yes. For more than 15 years AIR-FLOAT Conveyors have been successfully used in KENNEDY-designed cement and lime plants. With this background of experience, KENNEDY is now making AIR-FLOAT available to industry, mass producing it to sell at competitive prices.*

For more information on AIR-FLOAT, ask for Bulletin 58-K.

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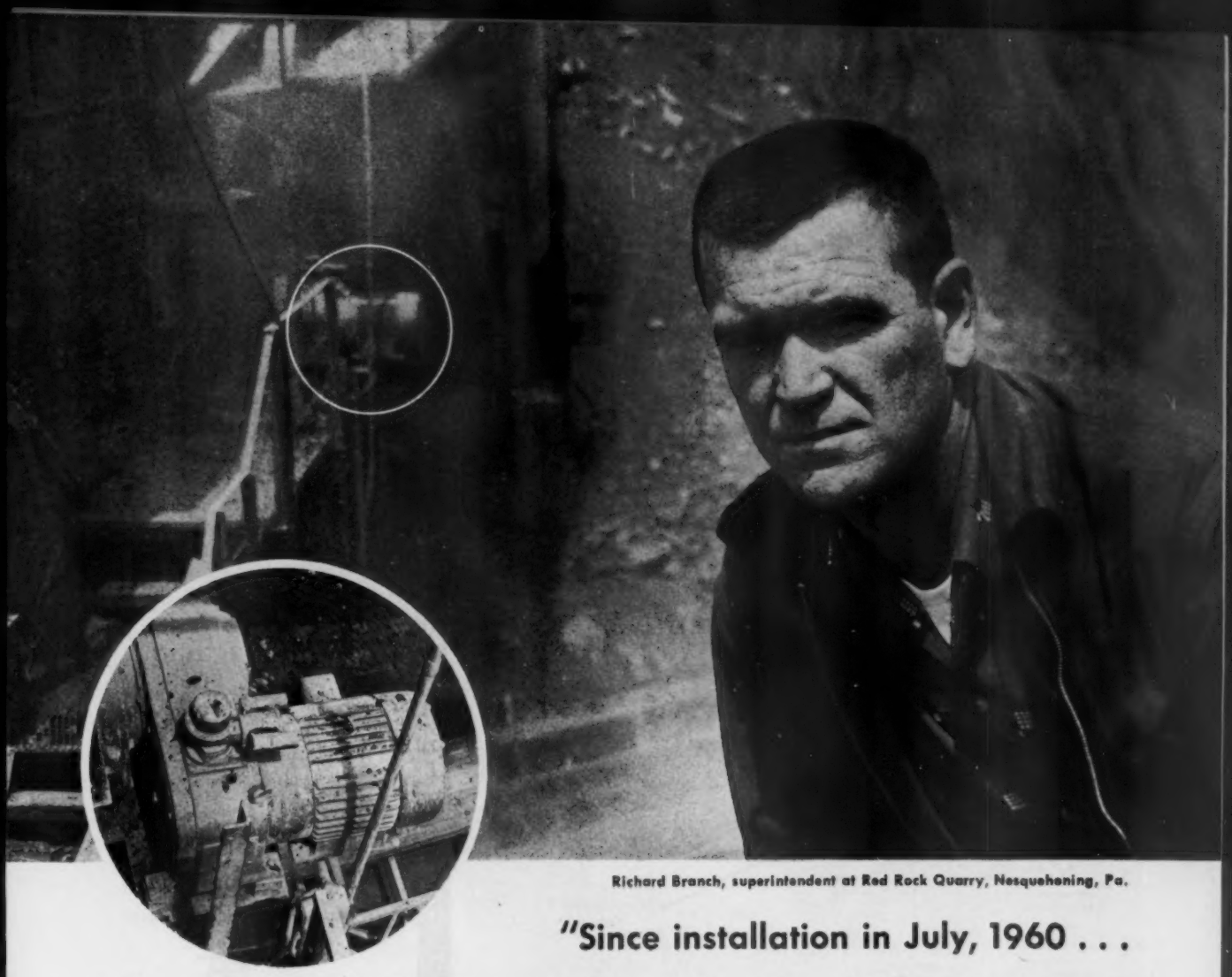

Richard Branch, superintendent at Red Rock Quarry, Nesquehoning, Pa.

"Since installation in July, 1960 . . .

Constant, Heavy Impact Hasn't Stopped Our General Electric Polydyne® Drive"

"Since we installed a General Electric Polydyne mechanical adjustable-speed drive on our Universal Wobbler Feeder, we haven't had a moment's downtime due to malfunction since July, 1960," says Richard Branch, superintendent at Red Rock Quarry, Nesquehoning, Pa.

The wobbler's elliptical bars convey large rocks to a crusher and let fines and dirt drop through to another conveyor. The rock is unusually hard sandstone, which stratifies into large, thin pieces. This type of material creates a tremendous strain on the drive unit during initial impact and separation.

"THE FORMER DRIVE cost us $2,939 in maintenance and eight days' lost production during the year and a half we used it," continues Mr. Branch. "General Electric's Polydyne Drive is 15 horsepower, same capacity as the old one, but it's physically larger and much stronger. It has proved itself an excellent solution for our tough operating conditions."

When your application requires low-cost adjustable speed, reliability, and ease of maintenance, investigate General Electric Polydyne Drives. Ask your G-E Sales Engineer or write for bulletin GEA-6806, Section 854-07, General Electric Co., Schenectady 5, N. Y.

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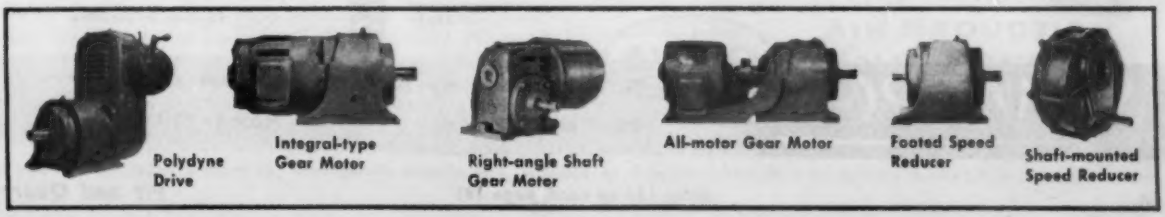

FOR EFFICIENT HIGH CAPACITY SCREENING

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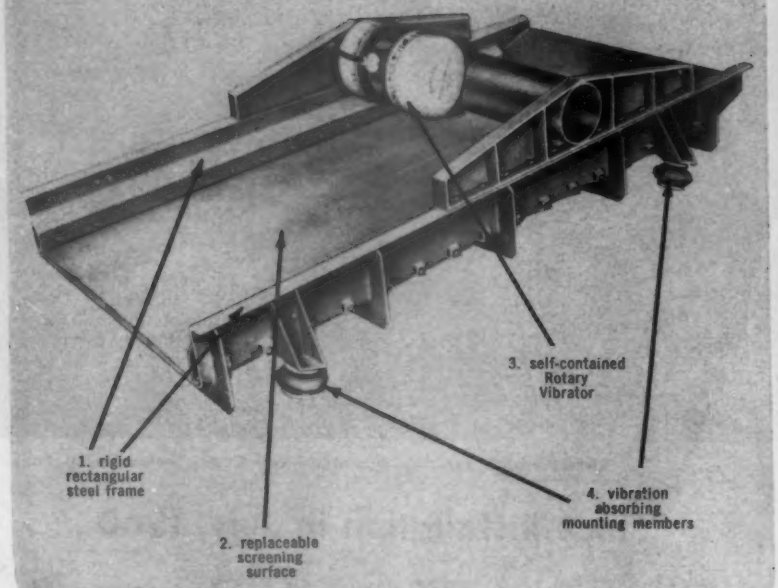
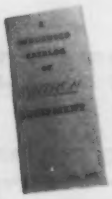
ROTARY VIBRATOR SCREENS


1. rigid rectangular steel frame
2. replaceable screening surface
3. self-contained Rotary Vibrator
4. vibration absorbing mounting members

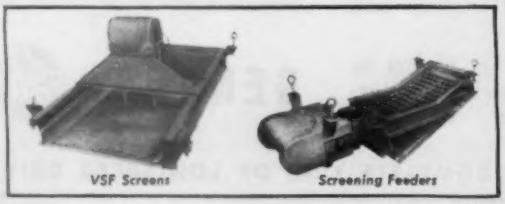
Designed to handle full range of screening applications, Syntron Rotary Vibrator Screens are adaptable to almost any process because this unique screen combines these features: rugged construction, powerful vibration, simple installation and long life.

Drive unit is a powerful, self-contained, unbalanced rotary vibrator —eliminates the need for belts, chains, or separately mounted motors. All models can be furnished with either 1800 or 900 vibrations per minute drive.

Syntron Rotary Vibrator Screens can be base or suspension mounted. Reduce screening costs. Get the most out of your screening equipment, specify Syntron Screens.



Write for a Syntron Catalog and the name of the nearest representative.



VSF Screens — Screening Feeders

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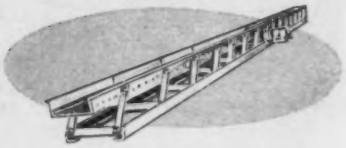
Gravimetric Feeders



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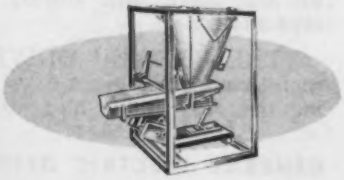
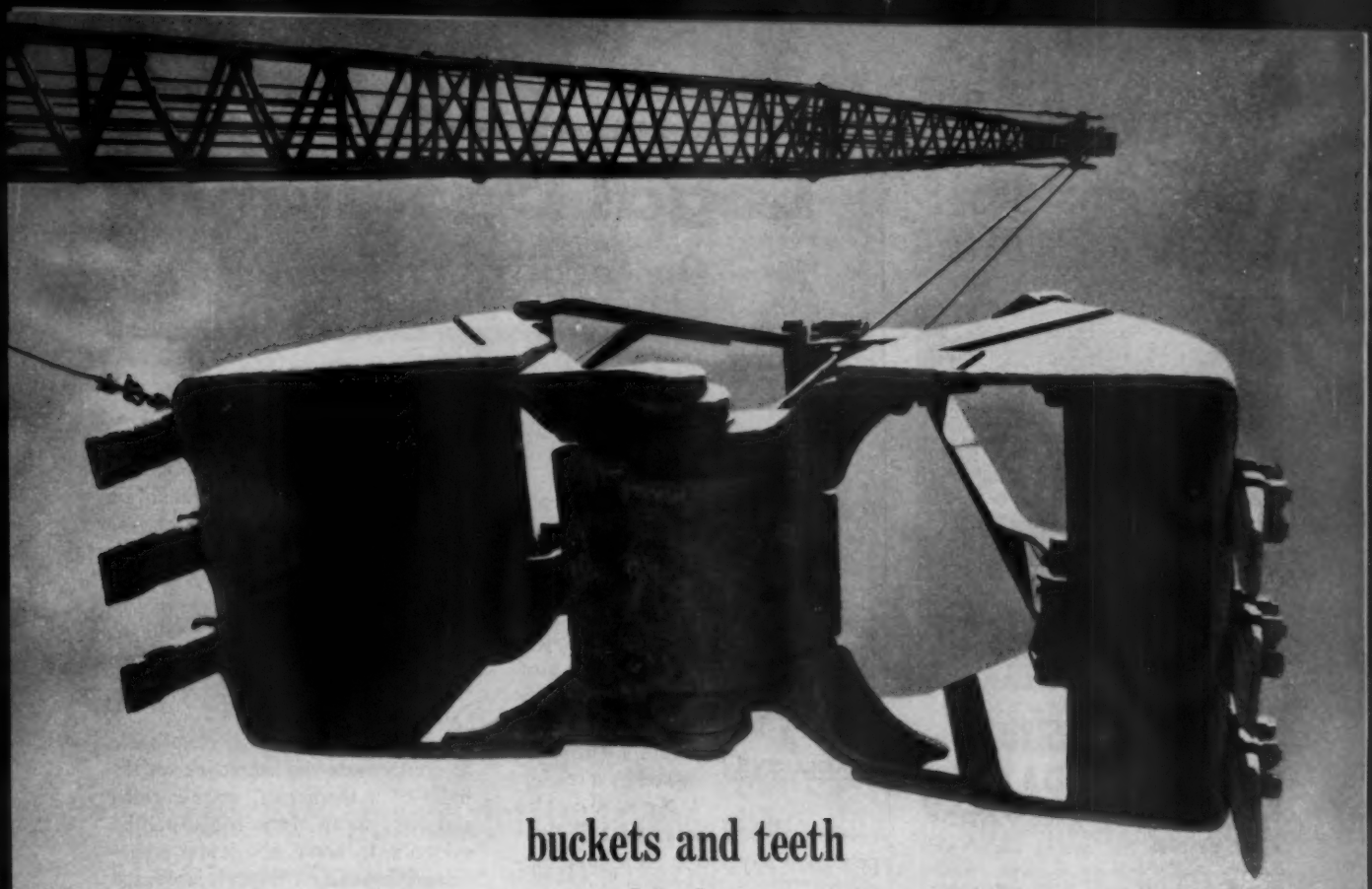


Dry Feeder Machine

SYNTRON

SYNTRON COMPANY

385 Carson Avenue • Homer City, Pa.



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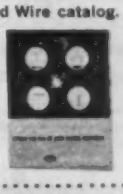

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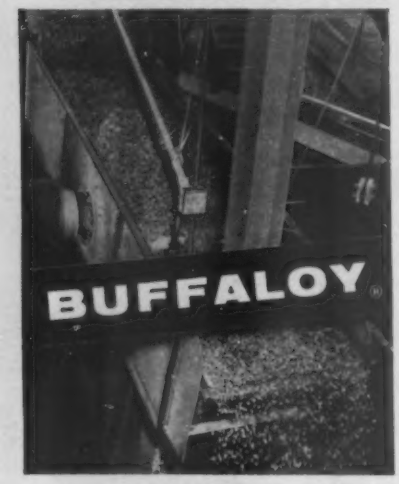

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Long experienced in serving the mineral aggregates industry, Buffalo Wire Works possesses the necessary skills to produce a wide selection of weaves and mesh sizes, with virtually any type of edging, for meeting your needs precisely.

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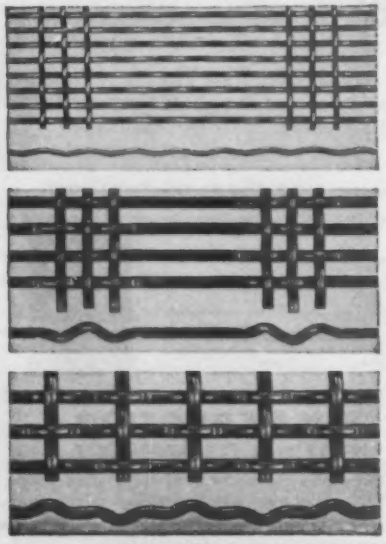

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Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Computing Compensation

RECENTLY a higher court rendered an unusually important decision which answers a question asked by a reader: "How do the courts arrive at the amount of compensation payable to an injured employee?"

For illustration, in *Johnson* v. *Bureau of Employees' Compensation*, 290 Fed. (2d) 355, the testimony showed the following facts: A man named Johnson was employed by a concrete block manufacturer. One day while engaged in loading concrete blocks onto a conveyance known as a scooter, Johnson twisted his back while lifting two blocks, as a consequence of which he suffered a trauma to the lower part of his back, including sprain of the lumbar region of the back. Johnson sued for compensation under the Compensation Act.

During the trial the testimony showed that Johnson was employed on a 5-day week basis and received an hourly wage. When he worked, his hourly wage was $2.35, and his daily wage was $18.80. Out of the 52 weeks of the year preceding his injury, Johnson had worked a total of 180 days and had received a total compensation of $3,399.76 for that year. The commissioner concluded that at the time of the injury Johnson's average weekly wages were $65.38 or $3,399.76, divided by 52 weeks. The commissioner used this weekly wage to compute compensation receivable by Johnson, as based upon the admitted percent of permanent disability. Johnson appealed to the court on the contention that the payable compensation should be figured on his annual wage of 300 times the average daily wage or salary for a six-day worker and 260 times the average daily wage or salary for a five-day worker. The higher court refused to agree with this contention and upheld the commissioner's decision, saying:

"Certainly it would be inequitable to compensate the employee on the basis of a theoretical wage-earning capacity where there is substantial evidence to show his actual wage-earning capacity. When injured, the employee may not be paid under the provisions of the act more than he earned."

Law of Depletion

An official of a corporation asked: "If the United States laws specify a definite percent for depletion of a material for income tax purposes, is a court required to comply with this law?"

The answer is, not strictly.

Section 114 (b) (3) and (4) of the Internal Revenue Code provide that in the case of mines, other natural deposits, and timber, a reasonable allowance for depletion shall be allowed in computing net income. For example, the allowance for phosphate rock fixed by Congress is 15 percent. However, according to a higher court decision rendered a few weeks ago, this law is not interpreted in a broad sense, because depletion is allowable only on materials in their natural state or form.

For instance, in *Soil Builders Company* v. *United States*, 277 Fed. Rep. (2d) 570, the testimony showed these facts: During the years around 1900 there was considerable mining activity in the Florida area directed toward taking hard rock phosphate out of the ground. This mineral was found in the form of a

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REPORT FROM WESTERN MATERIALS INC., PAMPA, TEXAS

"Our new 944 Traxcavator loads and levels nine 18-yd. trucks an hour

It gets its bucket full easier than other machines, is faster and handles better. Has plenty of reach for big trucks, too."

THAT's the word on the 944 from Craig Childers, Western's Plant Superintendent. And here's what the operator thinks about it, "I like the way it handles. It's really a fast-loading machine; and it has good balance and visibility. The idea of having the lift arms out front where you don't sit between them is great."

You can choose from three sizes in the new Traxcavator line. The 944 packs 105 HP and a 2 cu. yd. standard bucket—the big 966 at 140 HP carries a 2¾ cu. yd. standard bucket—and the 80 HP 922 has a 1¼ yd. bucket. All three mount a variety of buckets and attachments for handling various materials. And all three have what it takes to move more tons per hour and stay on the job month after month with far less maintenance.

Your Caterpillar Dealer has all the facts. Ask him to set up a Traxcavator demonstration on your job, and get a firsthand look at all the new ideas that are built into these machines. It'll be a real eye-opener.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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TRAXCAVATORS ARE MAKING OTHER LOADERS OBSOLETE

Here's how the 922, 944 and 966 are built to do a better job for you.

CAT DIESEL ENGINES—Turbocharged for efficiency and quick acceleration. Optional gasoline engines for the 922 and 944.

CAT POWER SHIFT TRANSMISSION—gives instant shifting, forward and reverse, 1st and 2nd speeds. High and low range selector also provides two-wheel drive for roading, four-wheel drive for power and traction in work cycles.

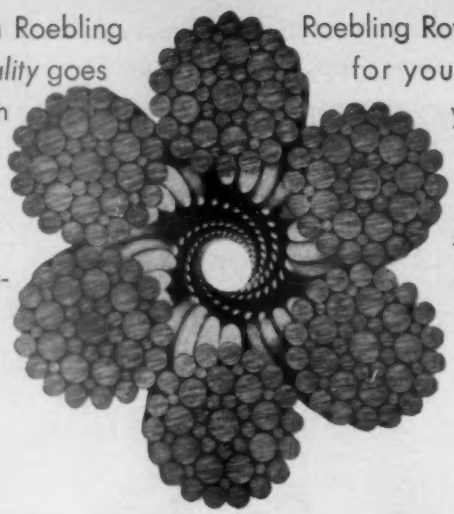
OPERATOR SAFETY—Lift arms and cylinders are forward of the operator and cockpit. Visibility is excellent and access is easy... up three wide steps.

LONG REACH—With the lift arms up front, the reach at dumping height of the new Traxcavators is impressive: 57" on the 966, 51" on the 944 and 41" on the 922.

OPERATOR CONVENIENCES—Bucket controls have automatic positioners to speed every cycle; machine controls are all power boosted for easy operation. Dual brakes give operator choice of braking with or without transmission engaged.

FULL LINE OF ATTACHMENTS—Special material buckets, side dump buckets, forks, cabs, etc.

Profit from the inside story on Roebling Royal Blue Wire Rope—the *quality* goes all the way through. Extra high strength in conjunction with uniformity of rope construction means unequalled resistance to wear and tear — and a whopping increase in service life. That is why every inch of Roebling Royal Blue pays off on the job for you. Get all the details from your wire rope distributor, or write for free booklet to Roebling's Wire Rope Division, Trenton 2, New Jersey.



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Quality inside and outside

We put a lot of work into it — You get a lot of work out of it

matrix, a block of hard phosphate with openings filled with sand, clay, and soft particles of phosphate. The chunks or matrices were subjected to a tumbling and washing process over a screen. The washing cleaned out of the openings in the matrix. Thus, sand, clay, and fine particles of phosphate passed through the screen and were discharged into natural watercourses. This caused the light particles, called colloidal phosphate, to drift slowly to rest on the bottom of the stream or remain in suspension until the water evaporated. Over the years, such washings built up accumulations of colloidal phosphate. While obviously such accumulations might have been found in the immediate vicinity of the mining and washing operations if the run-off water were permitted to stand there, the evidence was to the effect that these accumulations usually occurred from a quarter to half a mile from the mining activity.

Beginning some 40 years after the accumulations had thus occurred and after they had been covered over somewhat by soil, somewhat by vegetable matter, a thick growth of brushes, and even trees, it was realized that concentrated deposits of colloidal phosphate had commercial value as a fertilizer. The Soil Builders Company removed the overburden, dug it up and, after permitting it to dry, removed and bagged it for commercial use.

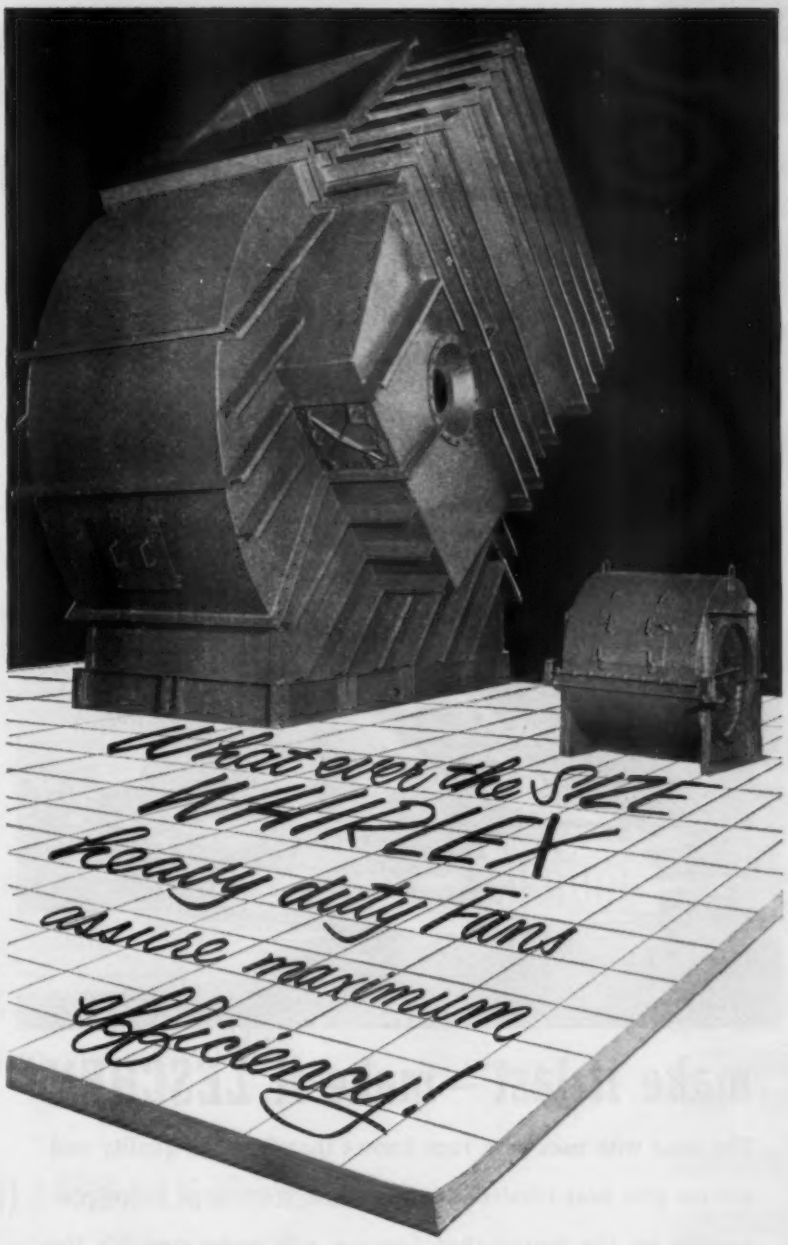
A law suit, involving payment of federal income taxes, developed when officials of the Soil Builders Company contended that this product meets the statutory definition of phosphate rock. Hence, the company's officials argued that it should be allowed 15 percent for depletion in paying its income tax.

The higher court refused to agree and said:

"The colloidal phosphate not only is not in its natural state; it is not even in its natural location."

Customer Must Use Care

An official of a ready mixed concrete company made this statement: "For several years I have read with a great deal of interest your legal reports. Now, I have a legal problem. Recently a customer was injured in our plant when he stumbled and fell



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over a bale of wire. He filed suit against our corporation for $25,000 damages. Can you assist our lawyer to win this suit?"

It is well established law that a customer who is injured by his own negligence cannot recover damages for the injury. According to a late higher court decision, all customers and other persons are expected by the law to watch out for dangerous conditions ordinarily encountered in a particular location.

For illustration, in *Griffin* v. *Fletcher Company, Inc.*, 97 N. W. (2d) 744, the testimony showed that a customer entered a plant to make a purchase. On the left hand side of an aisle was a roll of wire standing upon end. The customer's left foot caught in the portion of the wire protruding into the aisle, and he was caused to fall, sustaining permanent injuries. The higher court refused to hold the customer entitled to recover damages, and said:

"It was the duty of the defendant (company) to use reasonable care to maintain its plant in a reasonably safe condition for the use of its customers. The presence of the roll of wire standing apparently in plain view on the floor cannot be said to be evidence of negligence. The fact that the wire was unrolled to the extent indicated by the evidence was obvious. There is no reason that the defendant (company) should have anticipated that it would be a source of danger to invited persons who would expect to find in the conditions which would naturally attend the manner in which the business was openly and visibly carried on."

Hence, this higher court clearly held that customers are expected to use *reasonable* care to protect themselves against injuries caused by dangerous conditions and merchandise. In other words, this higher court held that this customer was negligent and not entitled to damages for the injury caused by the loose end of wire which extended into the aisle. It was his legal duty to expect such a dangerous condition in this area.

City Ordinance Held Valid

A reader asked: "If a gravel pit starts operations in the county, and later people build their homes nearby and finally a town is incorporated,

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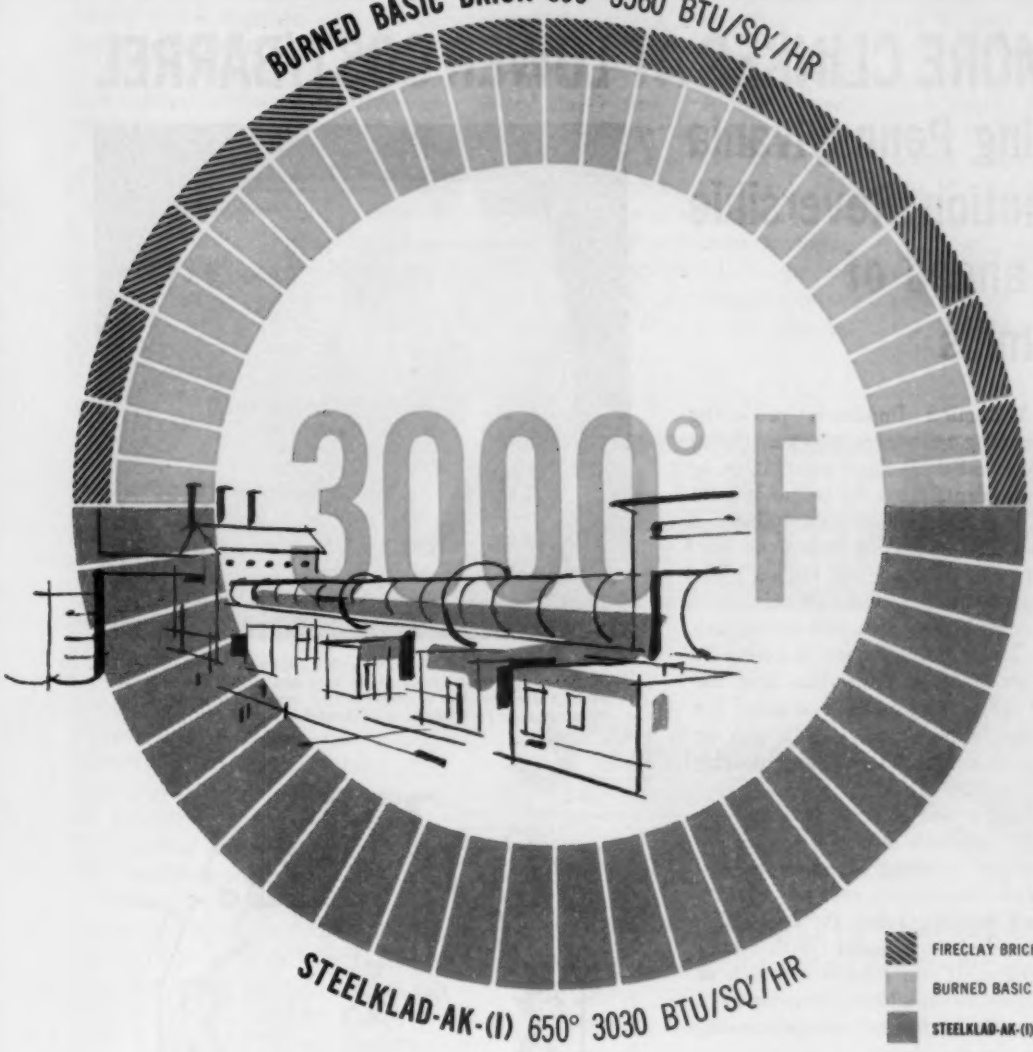
GENERAL REFRACTORIES



GREFCO STEELKLAD-AK-(I) BASIC KILN LINERS CUT HEAT LOSS UP TO 20% (And, reduced heat loss is reduced fuel costs)

The superior insulating properties of GREFCO's amazing Steelklad-AK-(I) keeps the heat you pay for inside the kiln where it belongs. You don't pay for wasted kiln heat And, Steelklad-AK-(I) stretches your labor dollar even further by cutting downtime and installation time.

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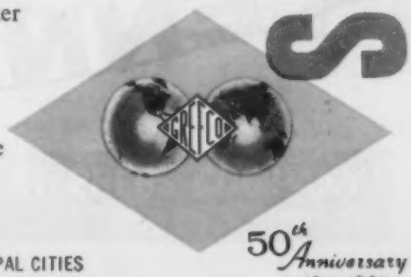
To learn how GREFCO Steelklad-AK-(I) Basic Kiln Liners can help improve your product, *and* save you money—call your GREFCO representative. (Or write GREFCO, 1520 Locust Street, Philadelphia 2, Pennsylvania.)



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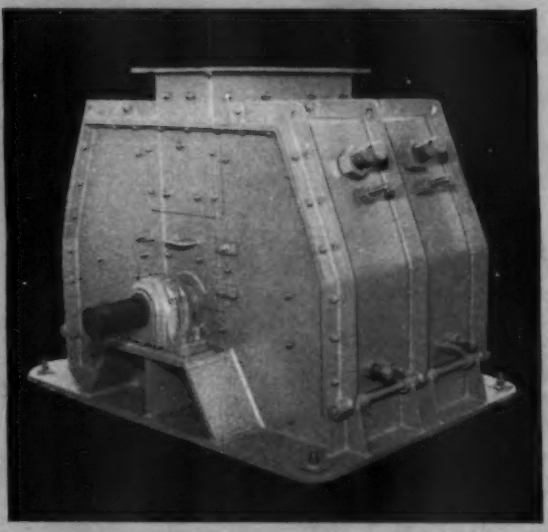
GRIND MORE CLINKER AT LOWER COST/BARREL

by installing Pennsylvania Fine-Reduction Reversible Impactor ahead of finishing mills



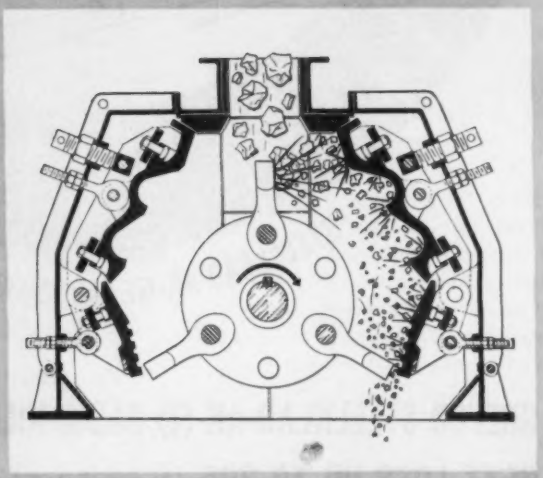
Pennsylvania 5-38 Fine-Reduction Reversible Impactor occupies less than 18 sq. ft. of floor space. Note in cross-section drawing, the multiple action impact crushing of a Pennsylvania Fine-Reduction Reversible Impactor.

Pennsylvania Fine-Reduction Impactors producing fines for feed to finishing mills can increase clinker grinding capacity by as much as 35 percent. Existing installations in cement plants prove the value of compact Fine-Reduction Impactors to precrush clinker . . . effect large economies in the grinding operation.

In a single pass through the Impactor, clinker is exposed to multiple action impact crushing as it ricochets back and forth between whirling hammers and adjustable breaker blocks. This multiple action crushing by impact produces a maximum of fines. The finer the feed to the finishing mills, the less work to grind the clinker to correct size. Also, grinding balls can be smaller in size to glean additional grinding capacity from existing mills.

The multiple crushing action of Pennsylvania Fine-Reduction Reversible Impactors is also a real profit-making factor in tertiary crushing of limestone and cement rock. This low-cost, sturdy crusher with its multiple action impact crushing raises the percentage of fines to the raw grinding department. With a finer feed, the raw grinding mills can handle as much as one-third more tonnage without a heavy investment in additional grinding mills or other raw processing accessories.

The compact Pennsylvania Fine-Reduction Impactor, occupying a minimum amount of space between the existing secondary crusher and the raw grinding mills, is the best way to obtain more capacity from existing equipment within a tight, new-equipment budget.



LET A TEST RUN PROVE IT!

Pennsylvania Crusher's extensive laboratories in West Chester are available to you at no obligation to determine if *your* raw and clinker grinding capacity can be increased to the degree enjoyed by other cement plants.

Your Pennsylvania Engineer will be glad to discuss Fine-Reduction Reversible Impactors with you . . . or write for free bulletin.

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PENNSYLVANIA CRUSHERS

BATH-BUILT

can the town pass and enforce ordinances which regulate and restrict operations of the pit?"

Very recently a higher court definitely answered this legal question in the affirmative.

For illustration, in *Town of Hempstead* v. *Goldblatt,* 172 N. E. (2d) 562, the testimony showed facts as follows: One Goldblatt is the owner of 38 acres of land located in the town of Hempstead. The property was purchased by Mr. Goldblatt's father in 1927, and the excavation and sale of sand and gravel has been carried on since 1927. Within a year after operations began, the excavation had gone below the water level, and an artificial lake was created, averaging now approximately 25 ft. in depth. The entire premises are surrounded by 7,000 lineal ft. of a 6-ft. chain-link fence, topped by three strands of barbed wire.

When the 38 acres of land were purchased and dredging operations began in 1927, the surrounding property was mainly farm land. The first provision for residential zoning of property was enacted in 1930. Thereafter and during the time Goldblatt continued the dredging operations, the surrounding area became heavily populated. In other words, Goldblatt did not bring his business into a residential area; the neighbors came into this area.

In a suit in 1956 the higher court held that Goldblatt had a legal right, consisting of a prior nonconforming use, to continue the excavation and operations under water on "their entire premises . . . notwithstanding any ordinances of the town to the contrary."

In 1958 the town passed another ordinance, changing the permitted grade of the declining angle of the slope of the pit from 45 to 30 deg., and requiring a concrete curb beneath the 7,000 ft. of fence. Also, the 1958 ordinance prohibited the use of the fence built according to a 1945 requirement. No object in the installation of this curbing has been shown except that it would put defendants to the expense of removing the fence, laying the concrete, and constructing a new fence.

Further testimony disclosed that in 1959 the United States Bureau of Mines statistics showed that the business of excavating and selling sand and gravel in the country totalled more than $700,000,000. The evidence shows that Goldblatt's gross annual business was in excess of $200,000, and that the capital investment was about $241,000.

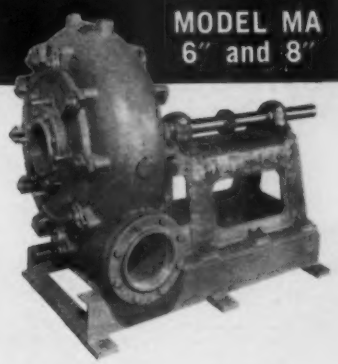
The higher court upheld the validity of the 1958 ordinance, saying:

"Included within a radius of 3,500 ft. of the premises are more than 2,200 homes, and four schools, with an enrollment of 4,500 children. The hazards to both life and property accompanying the uncontrolled operation of these pits are common knowledge. We do not believe that this ordinance can be declared as a matter of law to go beyond regulation to a degree which would impair its validity."

(Note: As reported in the news pages of this issue, the U. S. Supreme Court has granted review of the decision.)

HANDLES LARGE SOLIDS FAST —WITH EASE!

MODEL MA 6" and 8"



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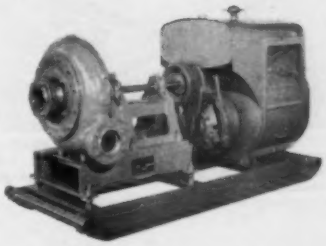
Designed for handling large quantities of sand and gravel economically, up to a total head of 100'. Simple design makes it easy to maintain close internal clearances. Rugged construction withstands shock of large solids. Clean, large passages insure **maximum** and **continuous delivery.**



Mounted on Skid Base with Gasoline Engine. Close coupled with V-belt drive. Either pump or industrial engine may be removed from structural steel base for separate use. Model MA pump is light in weight and compact for easy handling.

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Liability for Road Maintenance

Considerable discussion has arisen from time to time over the legal question: Is a property owner liable for expenses of maintaining an abutting private road if the deed does not provide that the lot owner will pay these expenses?

A few weeks ago a higher court answered in the negative.

For illustration, in *City View Association* v. *Salem Mausoleum,* 305 Pac. (2d) 379, it was shown that a company hauled rock, etc., over a private road adjacent its property. A disagreement arose between the subdivider of the land and the company as to whether or not the latter is liable for half the expense of maintenance of the private road necessitated by heavy motor trucks passing over the road.

The higher court held that the company is not liable for any road repair expenses since the contract and deed between it and the subdivider merely stated that the company had a perpetual and permanent right of way for ingress and egress over the road, and neither the contract nor deed stated that the company must pay any share of the expenses of keeping the road in repair. The court said:

"The company was not liable to contribute to the cost of maintenance of the roadway even though the deterioration was caused in part by heavy trucks."

Law of Eminent Domain

Another reader asked this important legal question: "If a state, county, or city condemns and appropriates land, can the owner expect to receive payment equal to what the land is worth to him?"

Broadly speaking the answer is in the negative.

For example, in *State* v. *Clearview Sand & Gravel Company,* 338 Pac. (2d) 135, the testimony showed that a state condemned and appropriated 8.1 acres of land owned by the Clearview Sand & Gravel Company.

The land contained an abundance of sand and gravel. The sand and gravel company's officials argued that the state should pay $225,000 as the fair market value of the 8.1 acres. This amount was based upon the product of the number of yards times 10 cents per yd., the prevailing value of the sand and gravel in that locality. In fact, expert witnesses testified to this value and in favor of the Clearview Sand & Gravel Company.

The jury awarded the Clearview Sand & Gravel Company $7,500 for the 8.1 acres for a gravel pit site. The higher court approved the verdict, saying:

"There was no evidence that, at the time of the condemnation action, a prospective purchaser would be willing to pay for the 8.1 acres of land a sum equal to the number of yards of gravel contained therein, multiplied by 10 cents per yd. The just compensation to be paid to an owner of property, in a constitutional sense, is what an owner has lost at the time of condemnation, and not what the condemner has gained. The court and jury were concerned only with evidence which would tend to establish the fair market value of the

100'x24" Stacker is one of four Kolman Stackers used in the production of aggregate at Squaw Valley, California, in preparation of roads and site for the 1960 Winter Olympic Games. Stackers in the background are 70'x24".

PNEUMATIC-TIRED STACKERS IN LENGTHS UP TO 150 FEET

Reports of outstanding performance by the Kolman Model 101-R Radial Stacker are rolling in from all parts of the country. Owners are enthusiastic about bonus features offered by the Kolman Stacker — features like cable suspension of the boom, two-position wheels, balanced electric drive on the head section, power lift, power travel, and cam hinge. Sizes up to 150 feet long build larger stockpiles with a single setting.

MINIMUM SEGREGATION

Kolman's cable suspension design eliminates the segregation encountered with stackers having fixed discharge heights. By raising the stacker as the pile is built, the fall of material is kept at a minimum.

MAXIMUM PORTABILITY

Even the largest Kolman Stackers are on dual pneumatic tires that roll easily on any level surface. Wheel assembles are mounted in quick-change frames to easily shift from radial arc position for stacking to parallel position for moving from one location to another in the stockpile area.

WRITE FOR LITERATURE

KOLMAN MANUFACTURING CO.

4800 West Twelfth Street Sioux Falls, S. D.

150'x30" Stacker shown includes electric power lift and electric power travel for finger-tip control of stacker discharge position.

100'x24" Stacker in the background stockpiles sand produced with an 8'x48" double-deck vibrating screen on a Model 101 Kolman Portable Conveyor-Screen Plant.

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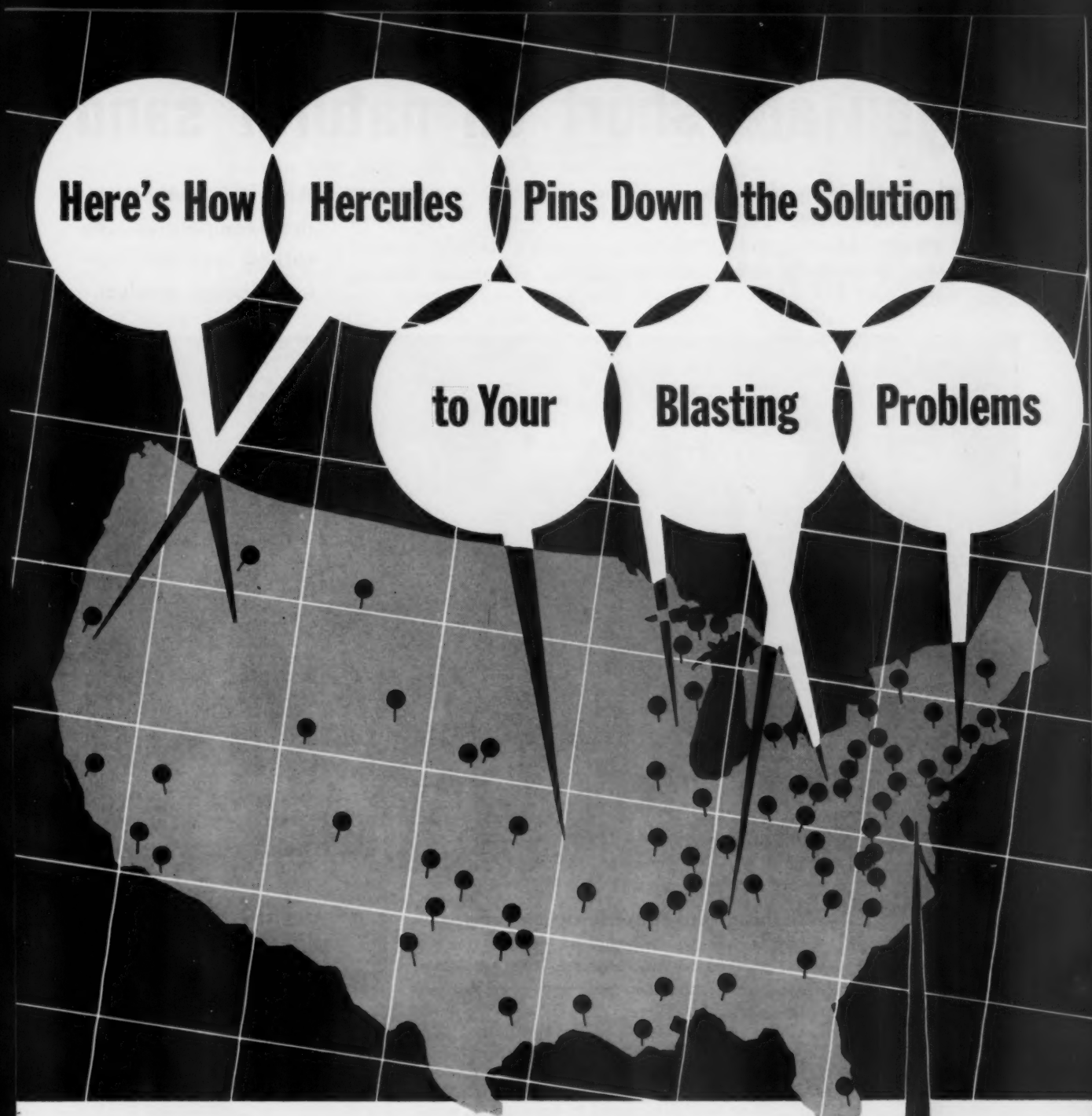
Here's How Hercules Pins Down the Solution to Your Blasting Problems



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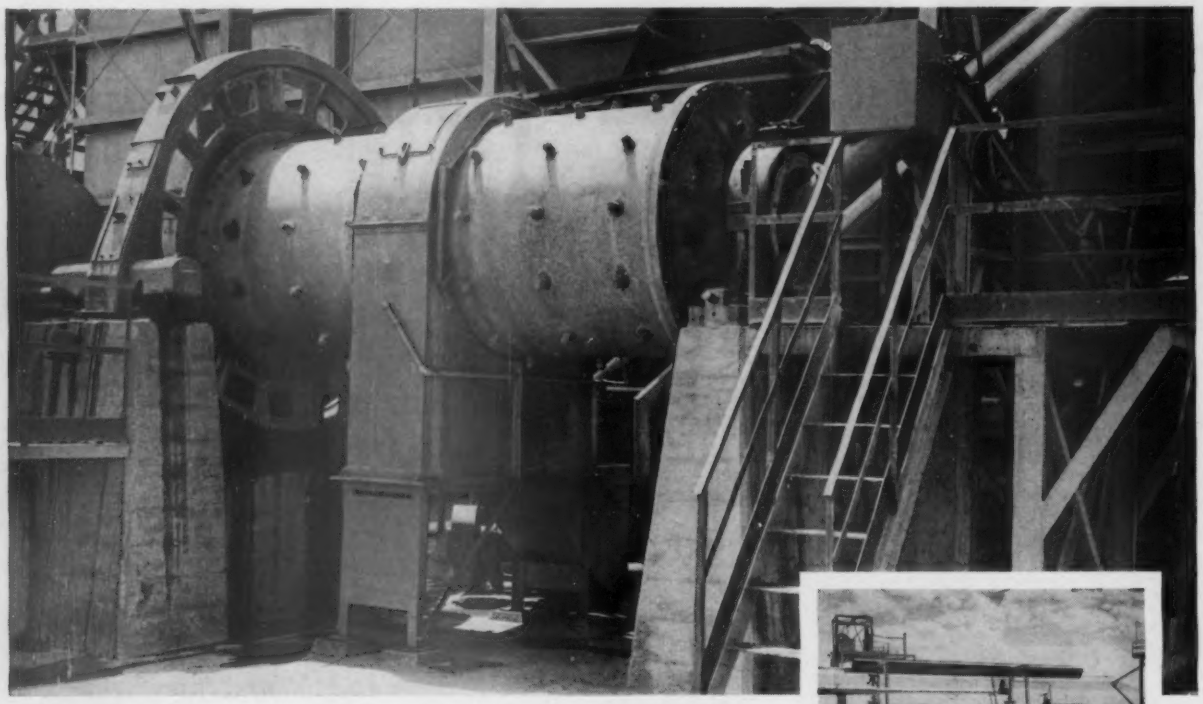
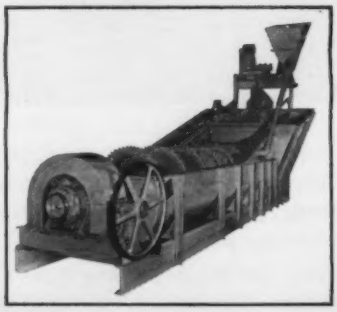
Also, this makes you more competitive...by cutting costs and having a better product.



Washing and Classifying...with the Akins Classifier you can wash, deslime, dewater, and *remove or save* sand sizes as desired. Akins provides a large, *working* pool area necessary to do this job efficiently.



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8.1 acres, which contained sand and gravel."

This was so although the lawyer representing the Clearview Sand & Gravel Company offered as evidence a copy of a lease agreement with the owner of a nearby gravel pit, in which the state had agreed to pay 10 cents per yd. for the gravel in place.

For comparison, see *State* v. *Mottman Company,* 321 Pac. (2d) 912, 914. The court held that in the absence of proof of a market demand and other factors which affect yardage values, it was improper for a jury to arrive at a value of property by multiplying the assumed number of cubic yards of material available by a given price per unit.

Compensation v. Damages

An official of a sand and gravel corporation asked: "Can an injured employee recover compensation and also damages from his employer? Of course, I know that state compensation laws limit the amount of compensation an employee can receive for an injury, but is this limitation applicable to suits for damages?"

As previously explained in these pages, an injured employee can recover compensation under the State Workmen's Compensation Act although the injury was sustained through his own negligence. This is so because the laws are designed to provide reasonable payments to injured employees during the period of their inability to perform their regular and usual services. However, when an injured employee sues for damages, the law is different. The employee never can recover damages unless he convinces the jury that his injury did not result from his own negligence but actually resulted from negligence of the party being sued.

For example, in *Lookner* v. *The York Company,* 132 N. E. (2d) 160, the testimony showed that an employee, named Lookner, was employed as a truck driver to haul rock and other materials. One day Lookner was seriously injured when he walked into an opening on a platform. Lookner sued the owner of these defective premises for damages on the contention that the latter was negligent in having such dangerous openings in its platform. However, the testimony showed that the space or opening was obvious to any reasonably careful person.

Therefore, the higher court refused to hold Lookner entitled to recover damages, and said:

"Where an unguarded space on the platform was obvious to any visitor, and Lookner had long known of its existence, the owner of the premises was not liable for injuries sustained when Lookner, while on the platform awaiting a shipment, walked into the opening."

On the other hand, if the jury decides that an injury was effected by the negligence of the party being sued, there is no limitation as to the amount of allowable damages.

An examination of certain damage awards made during the last few weeks disclose the following:

In *Jemison* v. *Pfeifer,* 157 Atl. (2d) 697, it was shown that an employee earned an average of $5,520.20 per year. He sustained injuries consisting of a fractured ankle and a fractured pelvis, due to negligence of his employer. The higher court awarded the employee $35,000 damages although he is now working regularly.

In *Reals* v. *Standard,* 113 So. (2d) 325, an employee received a severe blow on the chest and rib injuries whereby he was off his regular work for only 13 days. The higher court awarded this employee $4,000 damages.

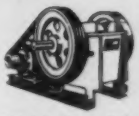
In *Yost* v. *General,* 173 F. Supp. 630, $125,000 damages were awarded to a 65-year-old machinist who lost his left arm 2 in. below his elbow.

In *Gist* v. *Allentown Wholesale Distributor,* 158 Atl. (2d) 777, $45,000 damages were awarded a 38-year-old man whose annual earnings were reduced by the injury from $4,700 to $2,200.

In *Castro* v. *Maritu,* 5 Cal. Rep. 200, the higher court approved a lower court's award of $20,000 damages to a 60-year-old man who could not get a job after his injury but had been earning $60 per week before the injury.

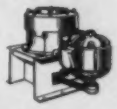
In the case of *Rauch* v. *Standard,* 104 N. W. (2d) 697, $90,000 damages were awarded a person for burns suffered over one-half the body. She was burned when a gas hot water heater exploded because

Laboratory Crushers and Pulverizers



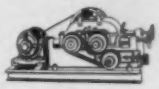
4"x 6" Massco Laboratory Jaw Crusher

Welded steel frame; manganese steel jaw and cheek plates; bronze bushed bearings; smooth jaws give better product and easier cleaning. Adjust for plate wear and product size by convenient hand wheel adjustment.



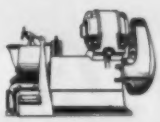
6" and 10" Massco Gy-Roll Reduction Crusher

Reduces ½" feed to as fine as 10 mesh in single pass. High capacity, low power consumption.



Laboratory Crushing Rolls

Sizes (Diameter x width): 10"x 6" and 12"x 8". Adjustable roll space setting up to ¾". V-belt drive. Heavy, cast frame absorbs vibration, results in long life.



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Disc type grinder with a planetery movement. No gears. Will grind ¼" to 150 mesh in one pass.

Marcy Pulp Density Scale

Gives direct reading of weight; specific gravity of liquids, pulps, and dry solids; percent solids in pulp. Very accurate. Easy to clean.

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The Company that cares enough to give you the best!

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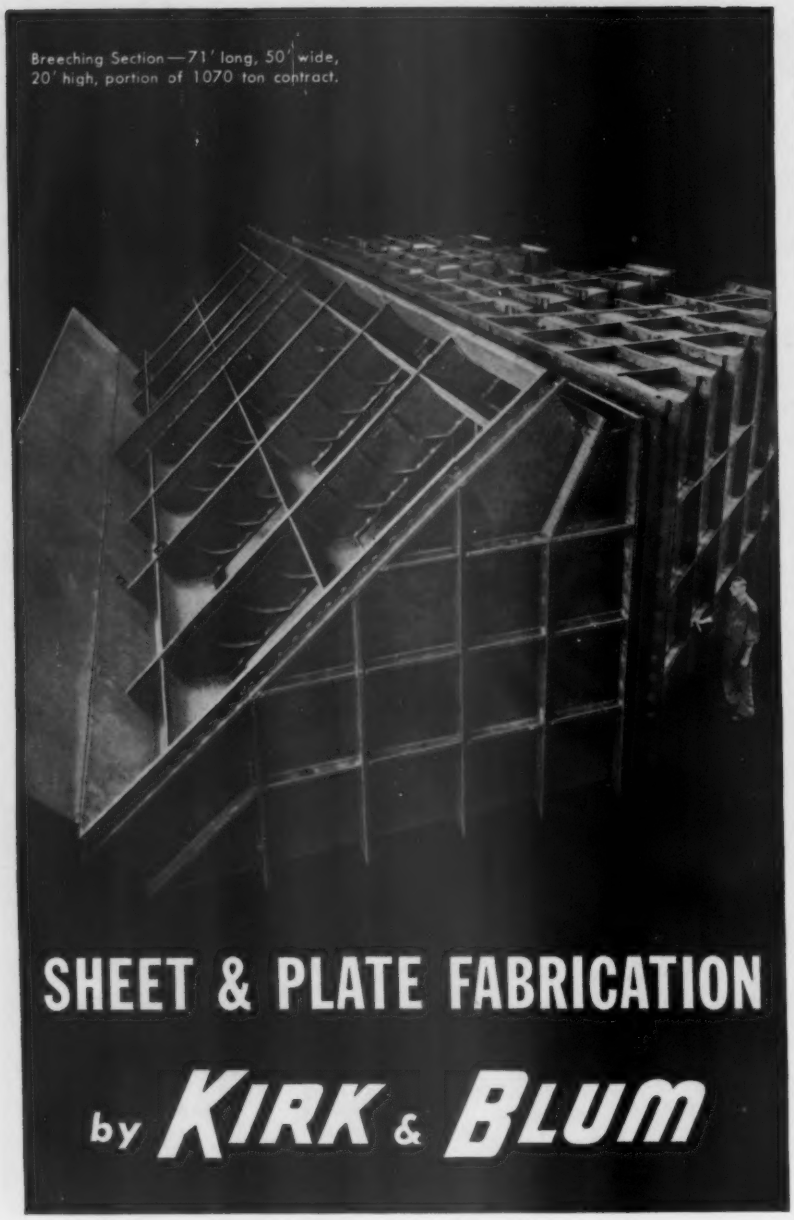

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Heavy assemblies, up to ½" thickness are produced, pre-assembled and loaded for shipping in a 50' x 480' bay with overhead handling capacity up to 25 tons.

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BINS • HOPPERS • INSULATION JACKETING • CONTROL PANELS & DESKS

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of a defective safety pilot valve. The testimony showed that an old safety valve had been replaced by a new valve which proved to be defective. This valve was purchased from a hardware dealer who had purchased it from the water heater manufacturer. The latter had purchased it from a valve manufacturer.

This higher court refused to hold either the hardware dealer or the valve manufacturer liable in damages, but held the heater manufacturer solely liable, saying that he was negligent in failing to test the valve before selling it to the hardware dealer for use on the heater. This court also said:

"The fact that the manufacturer purchased defective parts from another manufacturer does not free him from negligence in marketing a defective article . . . The verdict $90,000 (damages) is large, but the decreasing purchasing power of the dollar . . . has an inevitable tendency to bring about larger verdicts."

Owner of Mineral Estate Liable

A reader asked: "If the owner of a mineral estate on lands has a right by contract to dig into the land, can he be held liable to the owner of the surface estate for damages to the surface of the land while doing the digging and excavations?"

According to a late higher court decision, the answer is in the affirmative.

For example, in *Benton* v. *Manganese Corporation,* 313 S. W. (2d) 839, it was shown that the owner of a mineral estate brought suit against a surface estate owner to enjoin the owner of surface estate from interfering with entry by the owner of mineral estate on the lands for the purpose of mining operations. The lower court entered a judgment enjoining the owner of the surface estate from interfering with the owner of the mineral estate. The Supreme Court held that although the owner of the mineral estate had rights to dig pits for the removal of minerals, the digging by the latter resulted in complete destruction of the surface; and the owner of the surface estate was therefore entitled to damages. This court said:

"It was thoroughly established that such removal could be done

3 Lorains strip 1,083,000 yards of overburden

Three Lorains work in this clay pit at Toland, Pennsylvania. Two are shown here—a 2½-yd. Lorain 85A (top) and a ¾-yd. Lorain 26. There also is a 1-yd. Lorain 50 (not shown). All are owned by Philadelphia Clay Co., Carlisle, Pennsylvania, and are used in their 125-acre quarry to remove overburden from a white clay deposit that is used for making white cement.

What makes big operators like this come back time and time again to re-order Lorains? There is only one reason. Lorains put more profit in their pockets. Lorains do more, faster, for less. They keep ahead of the parade, not just up to it. The record of the shovel-crane industry over the years is studded with Lorain "firsts." It is this quality that makes Lorain first choice of progressive operators . . . regardless of the capacity machine they need.

Want to know more? Why not see your Lorain shovel-crane distributor for the full story.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN®

DOES MORE FASTER—FOR LESS

PLANTS in Lorain and Elyria, Ohio.

PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawler from ⅜- to 2½-yard capacity · Cranes from 7 to 80 tons . . . on crawlers, and as rubber tire Moto-Cranes, and Self-Propelled Cranes · Rubber tire front-end Moto-Loaders in 6,000-lb., 7,000-lb., and 9,000-lb. operating capacities.

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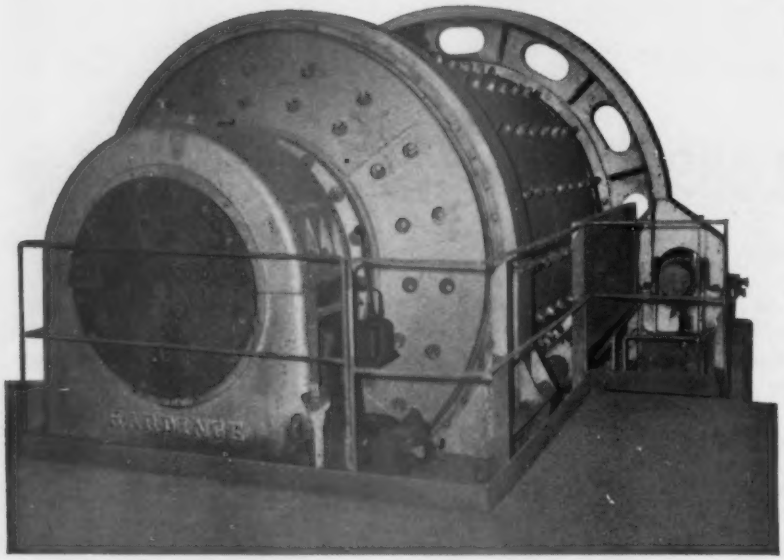
IMPROVED PRODUCTION

... look to Hardinge !

Hundreds of Hardinge Rod Mills are in use on such widely divergent applications as the reduction of aggregate, coke, abrasives, metallic and non-metallic ores, and the preparation of concrete sands. Mill sizes range from 2 feet to 12 feet shell diameter and up to 1500 Horsepower. They are available for either wet or dry grinding, arranged for trunnion overflow, or peripheral discharge (end or center). The conical heads of Hardinge Rod Mills provide a feed pocket to allow the charge to enter the rods without over loading or "choking." Ask for catalog No. 25-C-8.

HARDINGE ROD MILLS



An 8½' diameter by 12' long Hardinge Conical-Head Rod Mill grinding coke. Note the end peripheral discharge hood, starting lubricator and water-cooled bearings.

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only by open-pit mining, or strip mining: that is, the removal of the topsoil to a depth of 20 or 25 ft. by bulldozer or other soil moving machinery, and then the removal of the manganese throughout the entire vein. The result of such operations was to put a tremendous overburden on a part of the land and to leave deep holes or trenches in the mined portion of the land. The practical result of all of these operations is to leave the surface owner with only a hole in the ground for his purposes."

When Do "Minerals" Include Sand and Gravel?

The operator of a sand and gravel pit asked: "Does a deed or contract which contains a reservation on all the mineral, coal, oil, and gas include sand and gravel?"

Generally speaking, no, but a special clause in the deed or contract may vary this usual law.

For illustration, in *Matthews* v. *State of Michigan*, 96 N. W. (2d) 160, the testimony showed the following facts: A deed reserved all mineral, coal, oil, and gas on or within certain land. A special clause in the deed stated that mineral rights include sand and gravel.

In subsequent litigation, the higher court held that the mineral reservation included sand and gravel, saying:

"The primary question for our determination is whether the word 'mineral' as employed in the deed before us includes within its meaning sand and gravel. The word 'mineral' has a wealth of meanings. If we divide all earthly matter into animal, mineral, and vegetable kingdoms, the place of sand and gravel is obvious. Equally obvious it is that these substances are not mineral in the same sense as gold-bearing quartz. They were laboring under no mistake during the negotiation of the deed which plainly stated, 'Mineral rights include sand and gravel'."

This higher court explained further that ordinarily the term "minerals" does not include sand and gravel. In this respect, the court said that a special clause in a contract or deed is valid and enforceable which plainly provides that "minerals" include sand and gravel.

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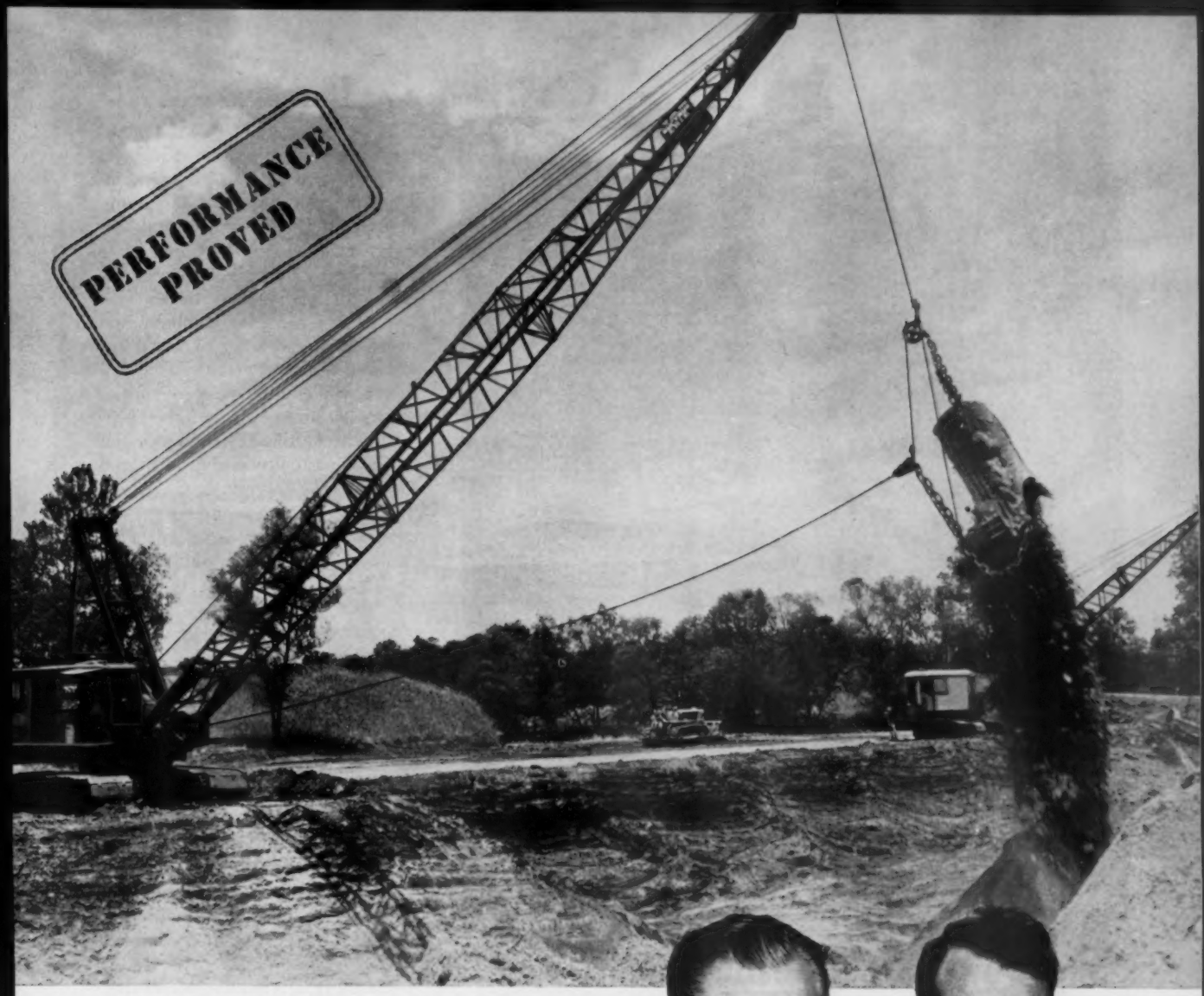

This 21000-powered Bucyrus-Erie dragline is swinging a 3-yd bucket on a stripping operation south of Seagoville, Texas.

H. GLENN BUTLER

CLARK FINDLEY

"20% more production on 40% less fuel with our Allis-Chalmers 21000 diesel"

. . . says Butler-Findley Co.

Repowering a Bucyrus-Erie 54-B dragline with an Allis-Chalmers 21000 diesel boosted stripping operations 20 percent for Butler-Findley Co., Dallas, according to Clark Findley, superintendent and production manager. "This engine has given a good old machine new life and stamina," said Mr. Findley.

H. Glenn Butler adds, "Not only that, we are realizing fuel savings of over 40 percent! The 21000 uses less than 5 gal. per hour compared with over 8 gal. for engines in our other machines of the same capacity. We get more work done with much less operation expense, which means dollars to us."

If you want to boost production and save money doing it, talk to your dealer about powering with a modern Allis-Chalmers diesel. Allis-Chalmers, Milwaukee 1, Wisconsin. BC-35

ALLIS-CHALMERS

***POWER* FOR A GROWING WORLD**

Fuller's quadrant air homogenizing has been perfected over the last ten years and is used today in over 125 installations throughout the world.

FULLER Airmerge Blending makes the wet process obsolete for many portland cement raw materials

In many cement plants, kiln feed has been obtained, which is so uniform that usual laboratory checks are inadequate to reveal variations.

Except where the unusual nature of the raw materials requires beneficiation by froth flotation, or other wet handling, today's preference is for the Dry Process with its fuel economy and its better quality control through Fuller Airmerge Blending.

Continuing research at Fuller is devoted to the application of pneumatics to the problems of the portland cement industry. Put Fuller technology to work for you.

If you are planning a new plant or improvements to an existing plant, use Fuller's know-how to help solve your quality control problems.

Write outlining your problem and for your copy of Bulletin B-2 on the Fuller Airmerge System. 4076 BA-2

See Pit and Quarry Handbook for further details and specifications.

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Liable for Nuisance

A reader asked: "Can a court hold a company liable in damages as a nuisance, and also issue an injunction against further similar operations?" The answer is yes.

For example, in *Melving* v. *A. L. Stone Co.*, 94 Pac. 390, it was disclosed that a property owner filed suit against a quarry company and proved that the latter operated engines, near his dwelling, using oil fuel which emitted large quantities of greasy soot and smoke. The property owner testified that the soot and smoke had considerably damaged the house and furniture.

After carefully considering the evidence the lower court decided that the property had been damaged because large quantities of greasy soot, dirt, and smoke were frequently emitted from the engines operated by the company. Therefore, the lower court rendered a verdict in favor of the property owner for heavy damages, and at the same time ordered the company to operate its plant in the future so as to not interfere with comfort of nearby property owners. The higher court sustained this verdict, saying:

"Where the nuisance operates to destroy health, or diminish the comfort of a dwelling, the party injured is entitled to protection by injunction."

Therefore, it is quite apparent that a court may hold a company which maintains a nuisance liable in damages and at the same time prohibit its further operations in a manner likely to continue the nuisance.

Missouri Portland Cement Company plans to build cement distribution facilities on the Ohio River at Joppa, Ill., adjacent to the 3,000,000-bbl. cement plant that is being constructed there.

A change of ownership was effected recently when the Red Bluff Sand and Gravel Company, Antelope, Calif., was sold to Tallent H. Ransome by G. E. Oaks. The transfer included land, stock, fixtures, machinery, and equipment.

Manufacturers' News

PATRICK L. MCMANUS has been appointed general manager of Worthington Corporation's Standard Pump Division, East Orange, N. J. He was formerly director of marketing services at the company's headquarters in Harrison, N. J. He has been with the company since 1936.

P. L. McManus

J. M. Sheehan Jr.

Fuller Company has announced the appointment of JOHN M. SHEEHAN JR., as advertising manager of the company.

Mr. Sheehan is rejoining the Fuller organization, where he served as assistant advertising manager from 1958 to 1960. Prior to rejoining Fuller he was a district manager for Putnam Publishing Company. He was also an advertising field representative for John W. Eshelmen & Sons, Lancaster, Pa., from 1954 to 1957.

WILL MITCHELL JR. has been appointed director, Research Division, Allis-Chalmers Manufacturing Company. He has been the division's acting director since September 1960.

He joined Allis-Chalmers in 1947 as director of the firm's basic industries laboratory and later was named research supervisor. He was appointed assistant director of research in 1951 and an associate director in 1956, which position he held until he was named acting director.

Mr. Mitchell is past president of the Mining Society of the American Institute of Mining, Metallurgical and Petroleum Engineers, and formerly a member of the board of directors of the A.I.M.E.

The Thermoid Division of H. K. Porter Company, Inc., and Colonial Supply Company, both of Pittsburgh, Pa., have combined sales efforts to provide industrial customers in Pittsburgh and western Pennsylvania with more efficient service and with what are reported to be the most complete stocks of industrial rubber products available in western Pennsylvania, including such products as Thermoid conveyor belting, V-belts, fire and industrial hose, ducting, tapes, sheet packing, and molded and extruded specialty rubber products.

The following appointments were recently announced by the Industrial Products group of Minneapolis-Honeywell Regulator Company:

JOSEPH A. BOWMAN, formerly branch sales manager at Detroit, becomes utilities market manager, with headquarters in Philadelphia.

GEORGE S. RAAB succeeds Mr. Bowman in Detroit as branch sales manager. He has held a similar position in Dayton, Ohio since 1958.

WILLIAM B. WELLS, for the last nine years an industrial salesman in the Pittsburgh branch office, succeeds Mr. Raab as the Dayton branch sales manager.

JACK W. LARSEN has been named branch sales manager at Cincinnati, succeeding RALPH A. LEWTAS, who has been named training co-ordinator and application engineer for the central region, with headquarters in Cleveland.

LEONARD D. CHRISTIE JR., product manager, technical sales, of The Babcock & Wilcox Company's Refractories Division, died recently following a short illness.

Mr. Christie joined B&W in 1939, became assistant to the technical director in 1945, and was named product manager in 1960. He was a member of the American Ceramic Society and the holder of many refractory patents.

C&EC Co

Continental
CONVEYOR
IDLERS

STANDARD ITEMS FROM STOCK!

Whatever your needs in bulk materials handling equipment, you'll find it in the Continental Conveyor line. Pulleys, Bearings, Take-Ups, Drives, Trippers, Feeders, Hold-Backs.

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CONTINENTAL CONVEYOR MAN

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CONVEYOR & EQUIPMENT CO.
Winfield Alabama

Sales Offices in: ATLANTA BIRMINGHAM DALLAS HUNTINGTON MEMPHIS NEW YORK

Formerly Industrial Division, Continental Gin Co.

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You Can Put This Line Together With a Hammer

Whether you need piping for air, water, tailings or ventilating service, the combination of NAYLOR Spiralweld pipe and Wedgelock couplings can save you time, trouble and money.

Here's a line with the strength and safety to handle all of these mining services, yet you can put it together with a hammer. The pipe is light in weight, so you can transport and handle it easily. Connections are simple and fast, too. The Wedgelock coupling is designed to join grooved-end pipe quickly—even with only one side of the pipe exposed. No special tools are required since a hammer is all you need to connect or disconnect the line.

Bulletin No. 59 will give you the details of this time, work and money-saving combination. Write for a copy today.

NAYLOR Wedgelock couplings make a positive connection securely anchored in standard weight grooved ends.

NAYLOR PIPE *Company*

1257 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

The Kennedy Van Saun Mfg. & Eng. Corporation, New York City, announces the appointment of GERHARD NIEMITZ to the position of consulting engineer with primary responsibility for directing the company's expanding development program. Mr. Niemitz has served for 17 years as chief engineer of Kennedy Van Saun.

ROY STARK will become the chief mechanical engineer with headquarters at the firm's Danville, Pa., plant where he will direct the activities of an expanded engineering department. Mr. Stark is former chief engineer of the McNally Pittsburg Mfg. Corporation, Pittsburg, Kans., which firm he has served since 1935 in various positions in the engineering department, and as assistant chief engineer from 1948 to 1957.

E. J. GOES, formerly advertising manager of the Koehring Co., Milwaukee, Wis., has joined Maercklein Advertising, Inc., Milwaukee, Wis. Mr. Goes will assume the position of manager, industrial accounts.

MAURICE G. MORLAN has been named industrial sales supervisor for Oliver Corporation's Memphis, Tenn., branch following a two-year period in a similar capacity at the company's Columbus, Ohio, branch.

Mr. Morlan has been in machinery and equipment sales since 1956, following 12 years of service as an Air Force pilot.

L. C. MOSLEY, manager of the mining division of Marion Power Shovel Company since 1946, died recently in Cleveland, Ohio, following heart surgery.

Mr. Mosley joined Marion as an application engineer in 1925. Specializing in the application of Marion shovels and draglines for open pit mining, Mr. Mosley studied mines all over the United States and Canada, and developed mining plans for many foreign countries.

For many years he was active in the American Mining Congress, the National Crushed Stone Association, the National Sand and Gravel Association, and the American Institute of Mining Engineers.

no more downtime to replace connectors...

HANCO FLUX POWER SCREEN HEATERS

transmit power through the air!

With the all new Flux Power by Hanco all mechanical connections between transformer and screen are eliminated. The 0 to 4000 ampere current is transmitted through the air by inserting a conductor through the eye of the transformer. This permits unrestricted vibration, maximum power transmission and true screen balance.

5 YEAR GUARANTEE

★ Dust-tight, waterproof construction
★ Dual voltage, 220/440 volt
★ Use either plain or stainless cloth
★ Anti-magnetic steel side rails

write today for full details:

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CANTON 7, OHIO, U. S. A. — CABLE HANCO

EUROPEAN SALES AND MFG.
HANCO INTERNATIONAL
6 WIBAUTSTRAAT • AMSTERDAM, HOLLAND

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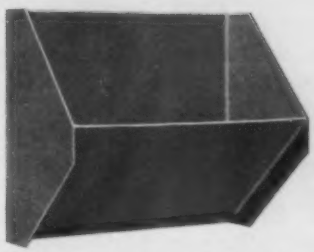
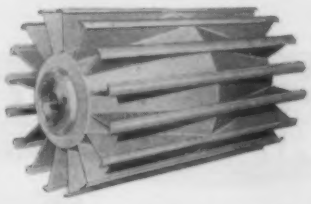
Conveying Costs got You over a bucket?

Swing to STANDARD METAL

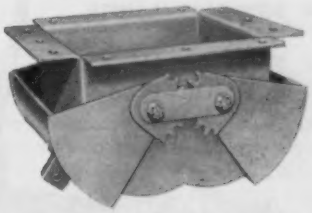
Elevating and Conveying Equipment



Continuous Elevator Bucket Style No. 2. Styles include Salem, Style "A" and other continuous style buckets.



Wing-Type Self-Cleaning Pulley. Dodge Taper-Lock® Hubs and Bushings Standard. Available also with solid hubs bored to specifications.



Duplex Bin Gate. Single Bin Gates also available.

Write **for catalog showing the complete Standard line.**

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STANDARD METAL MFG. CO.

110 CENTER ST. • MALINTA, OHIO

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Mahoning Valley Supply Company, of Cleveland, 500 S. Green Rd., Cleveland 21, Ohio, has been appointed a warehousing distributor for American Biltrite Rubber Company, Boston Woven Hose & Rubber Division, Boston, Mass.

The new distributor will supply service for Boston customers in Ohio, southern Michigan, and western New York.

Appointment of WRAY A. SHOCKLEY as manager of the pyro-processing machinery section, and of L. S. HOLLINGSWORTH as sales manager of the renewal parts section, has been announced by Allis-Chalmers processing machinery department.

Mr. Shockley succeeds C. E. BURNETT, recently named manager, process engineering, in Allis-Chalmers new cement industry department.

Mr. Hollingsworth is successor to D. L. F. WILSON, who becomes manager, Great Lakes accounts, for the company's cement industry department.

Mr. Shockley was sales manager of mineral processing machinery. Mr. Burnett had been manager of Allis-Chalmers pyro-processing machinery section since early 1960. Mr. Hollingsworth had been an assistant supervisor in the renewal parts section. Mr. Wilson was sales manager of renewal parts in the processing machinery department.

Berry Equipment Company, Fort Worth, Texas, has been appointed dealer in 12 Texas counties for Allis-Chalmers utility wheel and compact crawler tractors and a complete line of earthmoving and material handling equipment.

SHERLEY BERRY is sole owner and manager of the company. He has been identified in the new and used equipment business for the last 19 years.

Coastal Plains, Inc., 1631 Dragon St., Dallas, Tex., has been appointed Allis-Chalmers engine dealer for 32 counties in Texas. The firm is headed by P. W. GIFFORD.

NEIL RICHARDSON has returned to Brown-Bevis-Industrial Equipment Co., Los Angeles, as chief engineer of the aggregate-processing and asphalt-equipment division. He rejoins the concern after 2½ years spent as general manager of the Missile City Rock Co., Lompoc, Calif., where he designed, erected, and operated the Lompoc firm's crushed-stone and sand plants.

Earlier background of Mr. Richardson includes consulting engineer at Brown-Bevis-Industrial, and sales manager of the Universal Engineering Corp., Cedar Rapids, Ia., encompassing 20 years about equally divided between equipment manufacture and its field application.

Aggregate-processing equipment of a wide range is handled by Brown-Bevis-Industrial. It represents Iowa Manufacturing Co.; Eagle Iron Works; Kolman Manufacturing Co.; Simplicity Engineering Co.; Sauerman Bros., Inc.; Nordberg Manufacturing Co.; Symons Bros. Co.; International Harvester Co.; Frank G. Hough Co.; American Hoist & Derrick Co., and Chicago Pneumatic Tool Co.

Headquarters are in Los Angeles. Branch facilities for service, sales, and parts are maintained in San Diego, Bakersfield, and Riverside, Calif.

AMMCO
PORTABLE DREDGES
Today's Most Modern...
Most Versatile...
Portable Dredge!
★ 80% LESS MOVING PARTS
★ 80% LESS MAINTENANCE
★ ELEVATED CONTROL ROOM
★ ONE-MAN PUSHBUTTON CONTROL
★ POWERFUL HYDRAULIC DRIVES ON CUTTERHEAD AND WINCHES
AVAILABLE IN SIZES 8" TO 22"
MANUFACTURED IN THE UNITED STATES AND EUROPE
AMERICAN MARINE and MACHINE COMPANY
201 WOODYCREST AVE. • PHONE AL 4-8836 • NASHVILLE 11, TENN.
Enter 176 on card, page 181

E. F. Craven Company, 515 S. Eugene St., Greensboro, N. C., has been appointed Allis-Chalmers engine dealer for 19 counties in the western part of the state. It will sell and service engine and power units, engine driven electric generating sets and products for the marine trade.

The company, which has been an Allis-Chalmers construction machinery dealer for North Carolina since 1930, is headed by F. DUVAL CRAVEN. It has branches in Asheville and Charlotte.

Cherokee Warehouses, Inc., 520 W. 31st St., Chattanooga, Tenn., has been appointed Allis-Chalmers material handling dealer for three northeastern Alabama counties, nine in northwestern Georgia, two in southeastern Kentucky, and seven in southeastern Tennessee.

The firm is headed by J. D. KENNEDY SR.

Enter 177 on card, page 181 →

NOW THERE ARE FOUR "HDP" PRIMERS

to help you break more rock per shift

Now you can get **all** the economy of non-cap-sensitive blasting agents.

With the introduction of the HDP-5, you now have a complete "family" of Du Pont high Detonation Pressure Primers, especially created to develop full rock-breaking power from lower-priced blasting agents such as nitro-carbo-nitrates, Du Pont "Tovex" water compatible slurry, and prill/oil mixtures.

All four "HDP" Primers contain a high-density explosive which develops a velocity of almost 5 miles/second and a temperature of about 7500°F. This combination gives the very high detonation pressure to develop full energy from non-cap-sensitive products.

There's no nitroglycerin in "HDP" Primers, so they are less sensitive to shock and friction than dynamite primers. There's no headache causing ingredient.

And assembly to "Primacord" or caps is easy to make, through holes in the primers. You can even do it with heavy work gloves on.

Your Du Pont explosives representative or distributor can arrange for you to try out new "HDP" Primers now. Call him for details. Or for a copy of our new bulletin on the subject, write Du Pont, 2446 Nemours Building, Wilmington 98, Delaware. **EXPLOSIVES**

Meet the "HDP" Primer Family

HDP-1

PROPERTIES: Weight 1 lb. • Detonation Velocity 24,000 fps • Highly resistant to water and oil • Dimensions—3" diameter cylinder 2½" long • Two axial holes—1 for "Primacord" and 1 for electric blasting caps or MS delay electric blasting caps • Packed 48 primers per case—48 lbs. net

USE: Recommended for priming all NCN products, "TOVEX" gel, and prill/oil mixtures, bulk loaded or cartridged, in holes of 4" diameter and larger.

HDP-2

PROPERTIES: Weight ½ lb. • Detonation Velocity 24,000 fps • Highly resistant to water and oil • Dimensions—3" diameter cylinder 1.4" long • Two axial holes sized for use with "Primacord" only • Packed 100 primers per case—50 lbs. net

USE: Satisfactory for priming bulk loaded NCN products and prill/oil mixtures in holes of 4" diameter and larger.

HDP-3

PROPERTIES: Weight ½ lb. • Detonation Velocity 24,000 fps • Highly resistant to water and oil • Dimensions—1¾" diameter cylinder 3½" long • Single axial hole centered in the primer sized for "Primacord", electric blasting caps and MS delay electric blasting caps • Packed 150 primers per case—50 lbs. net

USE: Recommended for priming all bulk NCN products, "TOVEX" gel, and prill/oil mixtures in holes ranging from 2" to 4" inclusive in diameter.

HDP-5

PROPERTIES: Weight 5 lbs. • Detonation Velocity 24,000 fps • Highly resistant to water and oil • Dimensions—5¼" diameter cylinder 4¼" long • Two axial holes sized for use with "Primacord" only • Packed 12 primers per case—60 lbs. net

USE: Recommended for priming all NCN products, "Tovex" gels and prill/oil mixtures, bulk loaded or cartridged in holes of 8" diameter and larger, under exceptionally severe conditions.

Better Things for Better Living... *through Chemistry*

DU PONT

AT THE HEART OF INDUSTRY...

Live steam, inches away — yet this man's safe, next to the hose that death-causing steam cannot burst. U. S. Matchless® Steam Hose has its own built-in safety device. When it's ready for replacement, the wire-braid construction prevents it from bursting. Instead, just a wisp of steam seeps through, letting you know it's time for a new hose.
H 109

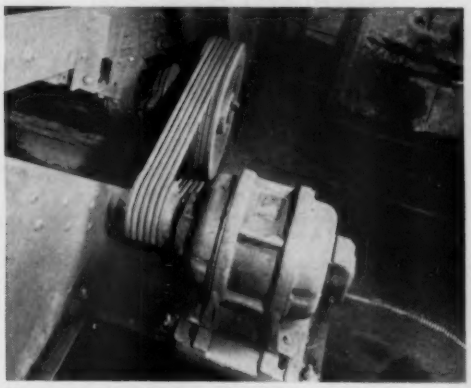
Mining and construction is rugged work, calling for products to match. And U.S. Rubber has long been known for the kind of rugged products that do more work, better, at less overall cost. That's why you'll see US products at the heart of mining and construction jobs everywhere.

Long after other hose have failed from the cuts, abrasion, and abuse of heavy-duty work, U. S. Matchless® Air Hose can be seen powering equipment at mining and construction sites everywhere. Its unique ability to withstand the toughest treatment is but one reason why U. S. Rubber is the largest producer of hose in the world, with a complete line of hose for every industrial need.

H 101

"On the job 3 times longer than belts previously used," says a co-owner of a Texas producer of foundry, chemical, and specialized sands about US HTB Elevator Belts. "We need belts that give long service at heats to 450°F, withstand terrific weight plus the abrasive action of sand. US Belts have never failed . . . never caused lost production or downtime."

CB 112



Known for maximum reliability, safety and profit, U. S. Royal V-Belts provide top efficiency, exceptional length stability, uniformity and long service life on all types of drives. You'll profit from the driving power of U. S. Royal V-Belts on conveyor, elevator, and loading-boom equipment; crushers, breakers, dryers and pumps; ventilator and cooling fans.

VB 109

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U. S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U. S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber

MECHANICAL GOODS DIVISION

HOW FAR... AND HOW FAST...

can you use computer control *profitably?*

BAILEY 700 SYSTEMS CAN HELP YOU DETERMINE THIS—ONE STEP AT A TIME

Can computer control be used—profitably—in your process operations?

Where and how?

The answer often lies in intermediate stages of improvement in sensing, measuring, controlling, computing.

Bailey engineers can help you determine and prove — one step at a time — how far analog or digital systems can be profitably applied in your operations. Bailey is equipped, by broad experience, to provide single-source responsibility from sensing and measuring instrumentation to complete automation. *Bailey 700 Systems* are installed, in operation, or on order, at locations from coast to coast and throughout the world.

Find out what this Bailey background can offer. Contact your Bailey District Office.

SIX STEPS TO FULL AUTOMATION

Centralize and simplify information display—use analog and digital techniques to clarify information, aid operator understanding, improve reliability of interpretation, and save space.

Extend use of interlocks and limiting circuitry—use digital solid-state components to extend supervisory controls, thereby minimizing effects of human error.

Increase use of automatic sub-loops—simplify and standardize the starting, controlling, and stopping of major plant components and sub-systems.

Extend on-line controls—integrate sub-loops, interlocks, and limiting controls with conventional controls to secure automatic operation over full range, once unit is on the line.

Provide performance monitoring—add computing facilities to provide significant up-to-date calculations for operation improvement and maintenance scheduling.

Integrate all system elements—add start-stop control to provide full automation, the ultimate goal.

C 158-1

CEMENT DIVISION

BAILEY METER COMPANY

1051 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

POWERED FLEXIBLE CONVEYORS and accessories (bag flatteners, stackers, etc.) used to load bags and packages into box cars and trucks are described in Catalog #567 released recently by *Power-Curve Conveyor Company.* (301)

"POWER-MAX," an automatic, adjustable centrifugal clutch, is described in a four-page engineering and application data folder offered by *Olme Precision, Inc.* Also given are specifications and dimensions for direct drive, V-belt and flat belt type units. (302)

"EXPERIENCE REPORT," an 8-page booklet of engineering and construction services for the cement industry is available from *The Rust Engineering Company.* Briefly, it describes such techniques as critical "path planning" to aid in plant design and process layout. Many cement plant projects handled by Rust are illustrated. (303)

HANDBOOK FOR WELDING Low Alloy High Tensile Steels is a 64-page reference guide published by *Alloy Rods Company,* and was compiled with the cooperation of major steel producers. This guide gives pertinent information on welding ore cars, dragline or dipper buckets, mining and quarrying haul vehicles, etc. (304)

PORTABLE PLANTS—crushers, screens, feeders, conveyors, etc.—their use and practicality are discussed and illustrated in Bulletin 276 (14 pages) released by *Smith Engineering Works.* (305)

ELECTRIC VIBRATORS designed to promote the free flow of bulk materials through bins, hoppers and chutes, (and vibrator accessories), are described and illustrated in the

FIRST CLASS
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NOVEMBER **PIT AND QUARRY** **1961**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

Void after 60 days.

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We produce _____

NOVEMBER **PIT AND QUARRY** **1961**

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We produce _____

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

NEW SUBSCRIPTION ORDER FORM

Send PIT AND QUARRY to me for

____One Year $3* ____Two Years $5 ____Three Years $6

____Payment enclosed ____Bill me ____Bill company

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Type of business and products _____

*U. S., U. S. Possessions, and Canada only.

Pan American countries, $10 a year; elsewhere, $15 a year.

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new 12-page Bulletin No. 81461 issued by *Syntron Company*. **(306)**

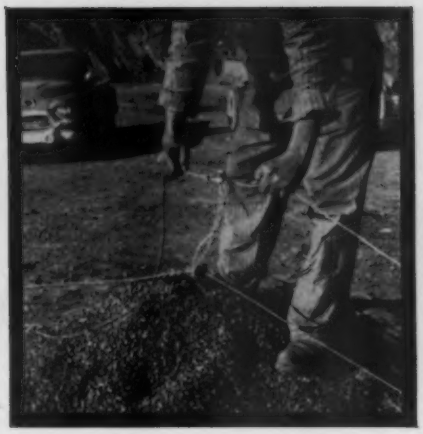
BULLETIN 100, issued by the *Hughes-Tyler Manufacturing Company*, describes the company's new, service-proved line of heavy duty, high carbon steel, spring troughing and return idlers for belt conveyors. **(307)**

NEW SUSPENDED MAGNET features for removal of tramp iron are described in Bulletin No. 1032 issued by *Stearns Magnetic Products Division*, Indiana General Corporation. Included is a table to specify data needed for selection and design of the correct unit for a given job. **(308)**

BULLETIN 175, Conveyor Belt Engineering, issued by *Hewitt-Robins*, is a report on a co-ordinated study by Pennsylvania State University and the company. This study resulted in an advance of conveyor system knowledge that will greatly benefit industry. Complete statistical data and tables for calculating, engineering, and selection of conveyor belting are included in this bulletin. **(309)**

270° DSM Screen, a new *Dorr-Oliver Incorporated* screen especially adapted for operation in grinding of cement raw mix with "increased mill output and overall reduction in power consumption," is described in leaflet #2300-A, issued by the company. **(310)**

TECHNICAL LITERATURE
offered here is free
unless otherwise noted.



Primacord®

provides maximum safety and dependability when using cap-sensitive explosives

Primacord Detonating Fuse provides a continuous line of detonation of sufficient strength to initiate any cap-sensitive explosive with which it comes in contact. A Primacord downline in your hole will result in full-column detonation, because it initiates every cartridge in the hole. Deck loading is simplified. Bridged cartridges or other causes of load separation do not result in the hazard of unexploded powder in the muck.

Primacord is relatively insensitive. It detonates at a speed of almost four miles per second along its entire length. It cannot be set off by sparks or stray electrical currents — or by normal vibration, friction and shock. It is simple, easy and economical to use.

The Primacord downline can be attached to the trunkline by simple knot connections. The shot can be fired instantaneously — or holes can be delayed by surface techniques using Primacord M/S Connectors.

These advantages make Primacord the ideal initiator for a wide range of blasting applications both underground and open pit. It is available in a number of standard and special types developed to meet varying needs. For further information, consult your explosives manufacturer or write

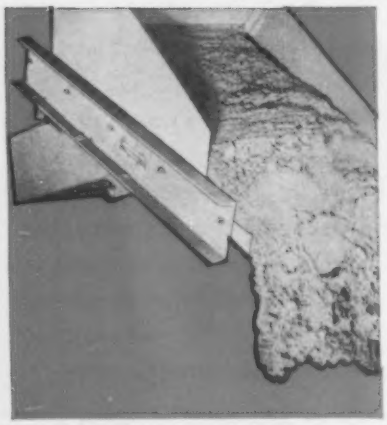
THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut • *Since 1836*
THERE IS A TYPE OF PRIMACORD® FOR EVERY TYPE OF BLASTING

Free! NEW GUIDE AND CONDENSED MANUAL: 'PRIMACORD DETONATING FUSE . . . WHAT IT IS . . . HOW TO USE IT.' ASK YOUR EXPLOSIVES MANUFACTURER OR WRITE US GIVING YOUR COMPANY NAME.

COMING YOUR WAY

The Carrier Amplitrol Feeder Demonstrator Truck. See an actual demonstration of the greatest advance in vibrating feeders. You get less maintenance...no damping ...precise feeding control...with the simple rugged "MECHANICAL" Amplitrol.

NOW...you can see for yourself... how CARRIER AMPLITROL CUTS FEEDING COSTS!



NATURAL FREQUENCY AMPLITROL FEEDER has only two operating parts...an A. C. motor exciter and rugged pneumatic springs. Discharge rate is controlled by simply changing air pressure in the springs.

WORDS ARE NOT ENOUGH to demonstrate the unique advantages of the Carrier AMPLITROL Feeder. That's why we've mounted an AMPLITROL on a demonstrator truck to show you that seeing *is* believing when it comes to AMPLITROL advantages. You'll see why you'll get:

GREATER CAPACITY...Size for size, AMPLITROL delivers more capacity under greater head load than any other type of vibrating feeder and feeds many "hard-to-handle" materials that other feeders can't.

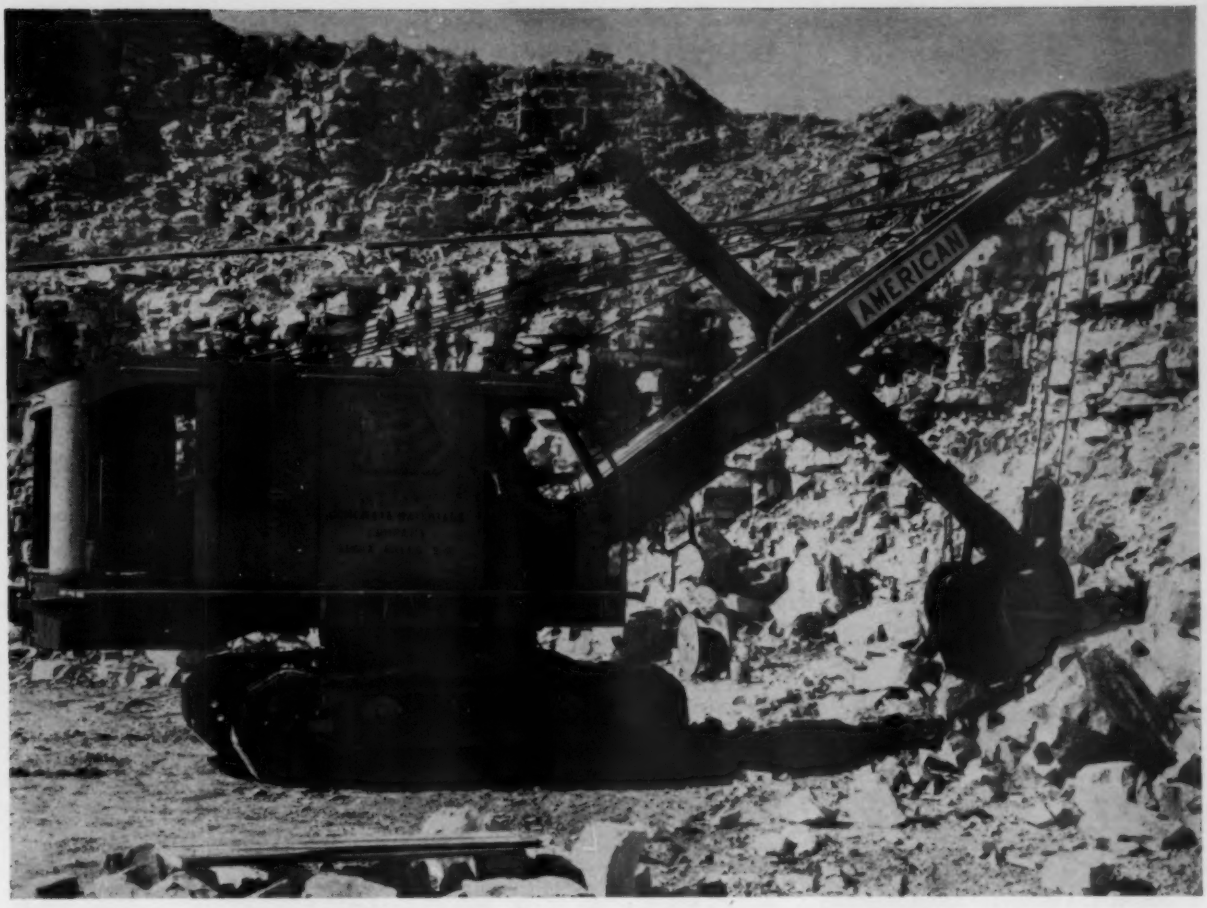
VARIABLE CAPACITY...From a trickle to a torrent with fully variable stepless AMPLITROL capacity control.

AUTOMATIC OR MANUAL CONTROL...Controls can be located either at the feeder or at remote locations—and can be automatically controlled from practically any process or operation.

LOW COST AND LOW MAINTENANCE...Simple mechanical drive employs Carrier NATURAL FREQUENCY principle that assures more work with less power...less maintenance cost.

GET THE COMPLETE STORY. Write us on your business letterhead about a demonstration. We are presently scheduling dates and locations for this unit and will be happy to tell you when it will be in your area. Address Carrier Division, CHAIN Belt Company, 225 N. Jackson St., Louisville, Ky.

CARRIER NATURAL FREQUENCY **VIBRATING EQUIPMENT**



After 8 years... "as efficient as the day we bought it"

That's what Concrete Materials, Inc., Sioux Falls, S. D., told us recently about their 700 Series AMERICAN, after 8 years of loading heavy shot rock. It's performance like this — year-in and year-out — that makes the difference in rock shovels. And the reason AMERICANS *stay* more efficient over the years, is because they're *more modern to start with.*

Anti-friction bearings are used at all important points, right on down to the brake linkages. Outboard bearings reduce shaft strains, are more easily accessible. Rugged box-welded deck and side frames are jig-bored to assure lasting shaft alignment. Tapered hook and load rollers eliminate sliding and scuffing action for smoother, easier swing. Travel machinery is widely recognized as the most rugged in the industry. In fact, there's *nothing* about an AMERICAN shovel that's a carry-over of designs of 10, 15, or more years ago.

It pays to get a truly modern shovel. And there's no shovel on the market that's as completely modern as an AMERICAN.

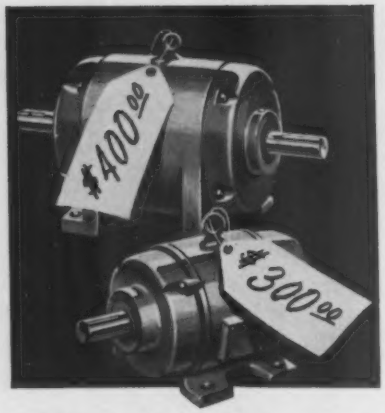
S-740

AMERICAN

AMERICAN HOIST and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

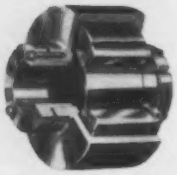
SHOVELS ½ TO 4½ YDS
CLAMSHELLS—DRAGLINES

FORGED FITTINGS FOR WIRE ROPE AND CHAIN
(Crosby-Laughlin Division)



CUT MOTOR COSTS

with "No Load" Centrifugal Clutches



Cushioned "no load" starts for high inertia and hard-to-start loads eliminate need for costly low voltage starting equipment, oversize and high torque motors and permit smaller, general purpose motors to be used.

- New design "A" Series centrifugal clutches are available for direct drive, shaft-to-shaft installations, also replace flexible couplings.
- Standard model capacities range from fractional hp to 3,000 hp with bore diameters from .500" to 8.375"
- Positive protection—in the event of jamming or overloading—is provided through automatic disengagement of clutch.

For more details write for Centrifugal Clutch Catalog, or contact your local Formsprag distributor.

9903

FORMSPRAG COMPANY
23599 HOOVER ROAD, DEPT. 122
WARREN (DETROIT), MICHIGAN

Precision Power Transmission Products

Enter 186-A on card, page 181

In order to provide expanded services to its customers in Brazil, a new subsidiary corporation has been formed by Dorr-Oliver Incorporated, Stamford, Conn. Known officially as Sociedade Tecnica, Industrial e Comercial Dorr-Oliver (Brasil) Ltda., the new company has its headquarters at Rua 15 de Novembro 164, 3° andar, Sao Paulo.

The new firm will conduct sales, engineering and procurement activities relating to installations of Dorr-Oliver equipment and processes in all sections of Brazil. Local manufacturing of D-O equipment will make use of independent Brazilian shop facilities.

Dorr-Oliver was formerly represented in Brazil by Sociedade Tecnica e Comercial Serva Ribeiro, S. A., whose president, DR. VICENTE RIBEIRO, is a partner in Dorr-Oliver (Brasil) Ltda.

Managing director of the new firm is PAUL MOURIER-PETERSEN, who was previously responsible for operations in Mexico and Central America for Dorr-Oliver Incorporated.

Roy Ingersoll

R. S. Ingersoll

ROY C. INGERSOLL, 76, retired as chairman of the board of Borg-Warner Corporation in September. Directors of the corporation have elected ROBERT S. INGERSOLL, president since 1956, to be chairman of the board and chief executive officer.

LESTER G. PORTER, former executive vice-president, was named to succeed ROBERT S. INGERSOLL as president.

The senior Ingersoll, a Borg-Warner official for almost as long as the company has existed, was named by the board to the newly-created position of honorary chairman. He will also continue as a director.

IT'S A FACT

Longyear unitized drill rigs slash set-up time, cut costs

Your crews carry out exploration projects faster and save dollars with a Longyear jeep-mounted Diamond Drill. No heavy lugging or time wasted moving from job to job. Jeep-mounted rigs are available with the popular Longyear "Prospector" or powerful "24". Respective capacities 300 ft. and 750 ft. with EX rods.

For complete Information contact our nearest office.

Longyear

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LONGYEAR N. V.
The Hague, Holland
LONGYEAR ET CIE
Paris, France
CHRISTENSEN LONGYEAR (INDIA) LTD.
Bombay, India

Enter 186-B on card, page 181

Expansion of the mechanical engineering services of Engineers Incorporated, Newark, N. J., consulting engineers, has been announced by JOSEPH ROSENTHAL, president.

Simultaneously, the acquisition of the engineering practice of Julius Berger, M.E., and the merger of the firm into its expanded operations was announced. Terms of the transaction were not disclosed.

Dorcon Incorporated, a wholly owned subsidiary of Dorr-Oliver Incorporated, Stamford, Conn., is being formed to engage in the design, manufacture, fabrication, and field erection of metal tanks, water and chemical storage facilities, and process and reaction vessels.

Officers of the new company will be ALEX FINO, president; K. EARL ABEL, treasurer; and JOHN W. SWICK, secretary.

Administrative and engineering offices will be at Warren, Pa., and sales headquarters in Pittsburgh, Pa., with MAX G. WALKER as sales mgr.

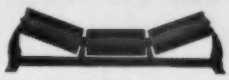
WILLIAM B. WINTER has been named manager of production planning and control at the South Milwaukee (Wis.) Works of Bucyrus-Erie Co. He formerly was general foreman, plate and weld, and prior to that appointment served as quality control manager.

The Ruberoid Co. opened its new general offices at 733 Third Ave., New York, N. Y., June 19, 1961. In addition to the executive and administrative staffs of the parent company, the new offices will house personnel of the Mastic Tile and Funkhouser Mills divisions.

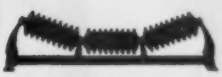
A. FOSTER SHELLER has been named vice-president of manufacturing for the Waukesha Motor Company, Waukesha, Wis. In his new position, Mr. Sheller will supervise and coordinate activities of the departments within the organization directly concerned with, or closely related to, the manufacturing process.

ATLAS IDLERS AND PULLEYS

WILL INCREASE YOUR PROFITS BY HANDLING GREATER LOADS AT LOWEST COSTS



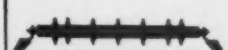
TROUGHING IDLERS



IMPACT IDLERS

RETURN IDLERS

SELF-ALIGNING IDLERS

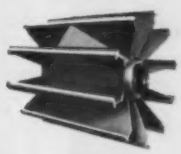


RUBBER DISC RETURN IDLERS

ATLAS idlers are available for 12" through 48" belts: 3½", 4" and 5" dia. rolls with ball and roller bearings.

For many years ATLAS idlers have been providing trouble free service. These idlers are designed to meet the most exacting requirements of general and heavy duty service. The use of ATLAS idlers assure users minimum maintenance cost and maximum equipment life.

SOLID TYPE CONVEYOR PULLEYS



WING TYPE SELF CLEANING PULLEYS WITH EASY ON — EASY OFF TAPER-LOCK BUSHINGS

See Your ATLAS Distributor or Contact • Ask for Bulletins 8C and 9A.

ATLAS CONVEYOR CO., CLINTONVILLE, WISCONSIN, U.S.A.

Manufacturers of portable and stationary conveyors and bucket elevators for handling loose material such as sand, gravel, crushed stone, coal, coke, cement, etc.

Enter 187-A on card, page 181

In Cement and Aggregates the Word for Air Separation is "Sturtevant"

in cement . . .

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screen-blinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT
MILL COMPANY
104 Clayton St., Boston, Mass.

Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators

Enter 187-B on card, page 181

YOU SAVE WHEN YOU USE RANITE

THE SERVICE LIFE OF MANY PARTS CAN BE
GREATLY INCREASED BY HARD SURFACING

RANOMATIC HARD SURFACING IN COILED WIRE

RANITE HARD SURFACING IN STICK ROD

CALL YOUR RANITE DISTRIBUTOR OR WRITE DIRECT

RANKIN MANUFACTURING COMPANY

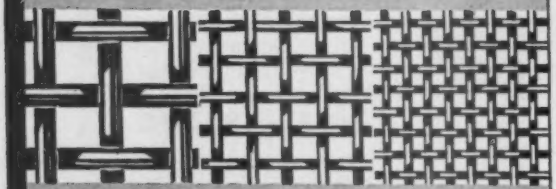
616 SOUTH MARENGO AVENUE • P. O. BOX 631 • ALHAMBRA, CALIFORNIA

Enter 188-A on card, page 181

STRONG AS ARMOR

NAT-ALOY

Woven Wire Screens



Reliable Nat-Aloy woven wire cloth is specified throughout industry for maximum screening accuracy and economy. Available in flat surface, lock crimp, double crimp, rectangular and long slot openings. All sizes, meshes and gauges—prompt shipment.

WE OFFER NOW... SUPER NAT-ALOY
OIL TEMPERED WOVEN WIRE CLOTH

★ GREATER RESISTANCE TO ABRASION
★ MORE TONNAGE AT LOWER COST
★ FEWER COSTLY CHANGE OVERS

Write for information. Also stainless steel wire screens.

NATIONAL WIRE CLOTH COMPANY
252 W. Fairfield Ave., St. Paul 1, Minnesota

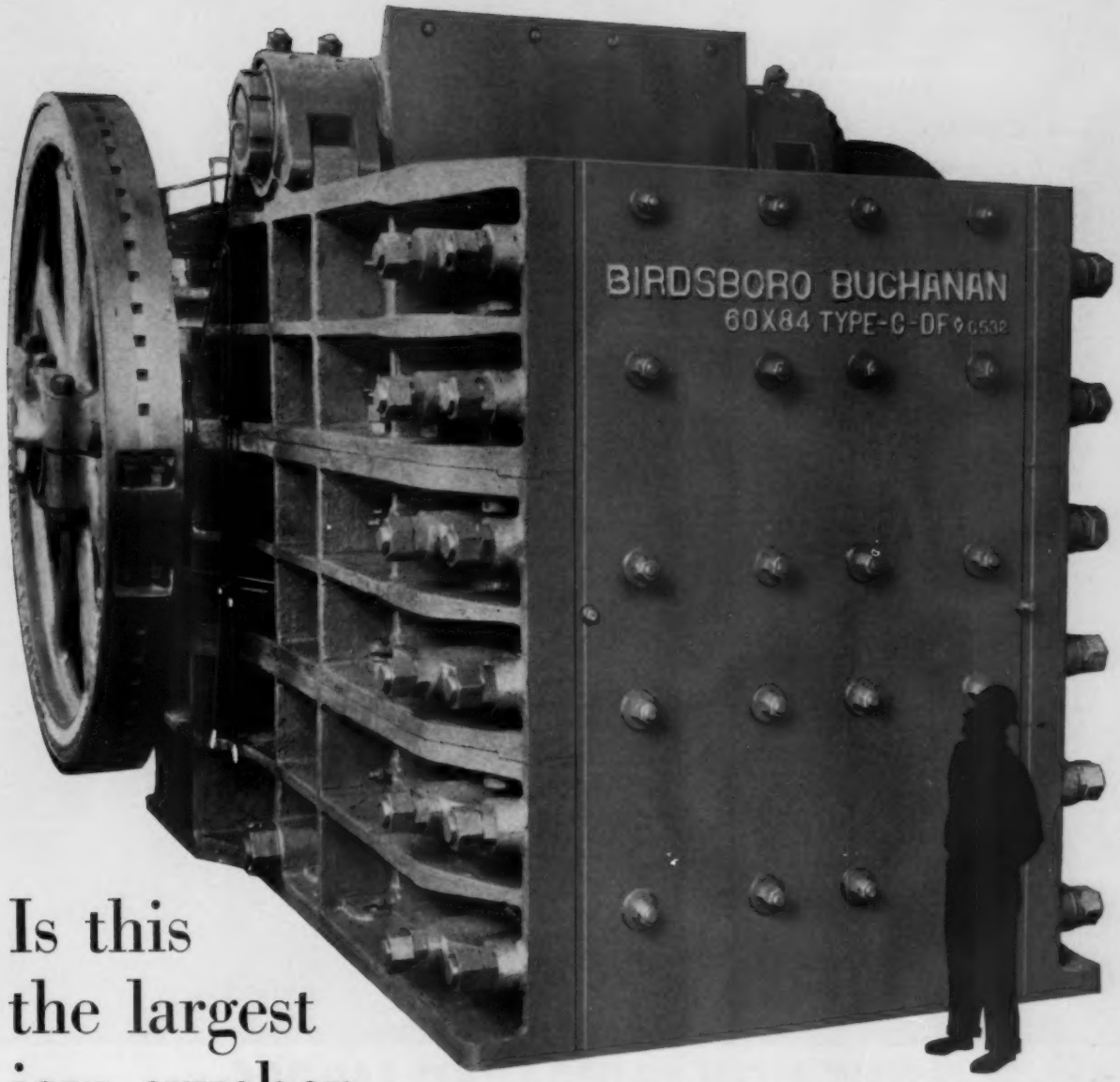
Enter 188-B on card, page 181

Fight HEART DISEASE

1

\# ENEMY

Give HEART FUND



Is this the largest jaw crusher in Chile?

Ready to reduce up to 880 tons of iron ore per hour, this new Birdsboro-Buchanan deep frame jaw crusher is believed to be the largest ever sent to Chile. Weighing over half a million pounds, the huge 60″ x 84″ Type-C-DF crusher will reduce five-foot lumps of iron ore to eight-inch size.

This crusher is one of many of similar design and size built by Birdsboro Corporation in recent years. To tap this valuable manufacturing experience, let Birdsboro build your next crusher. For details, write: *Sales Department, Engineering Department & Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

Canadian Representative & Manufacturer: John Inglis Co., Ltd., Toronto, Canada.

World-Wide Agent Representation. Contact home office for nearest representative.

CR 35-61

BIRDSBORO

CORPORATION BIRDSBORO, PENNSYLVANIA

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

DIVISIONS: **MIRAWAL DIVISION • CHEMICAL MACHINERY DIVISION**

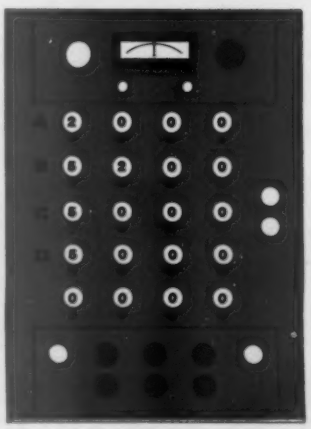
TIME SAVER... MONEY SAVER...

THE NEW FAIRBANKS-MORSE BATCHETRON

One of the latest developments in Fairbanks, Morse's 131 year experience in the weighing business is the *new* Batchetron. It is specifically designed for fast, accurate proportioning of any material that can be pushed, poured or dropped into weigh hoppers. It uses high-speed electronic methods to weigh and batch a number of liquids or solids—in sequence or simultaneously—by means of manual or punched card control.

The Batchetron is easy to set. Its high-speed action assures positive cutoff of ingredient flow. Interlocks prevent incorrect operation . . . halt operation if anything goes wrong. An improved, electronic weight-sensing system provides long, accurate, trouble-free service with exact batch repeatability every time. At all times control of operations is lightning fast.

The control panel of the Batchetron allows the operator to adjust for hopper tare weights, while pilot lights indicate batching startup, sequence and finish.



Use of the F-M Batchetron results in substantial time and money savings for the chemical and food industries . . . for concrete and asphalt batching plants . . . for the many applications where high-speed weighing and proportioning are important. And, of course, the many years of Fairbanks-Morse precision craftsmanship stand behind every Batchetron.

Learn what the Batchetron can do to make *your* operations more profitable.

Write: Fairbanks, Morse & Co.; Electronics Division; 100 Electra Lane, East Station; Yonkers, New York

ELECTRONICS DIVISION
FAIRBANKS MORSE
A MAJOR INDUSTRIAL COMPONENT OF
FAIRBANKS WHITNEY

MARION C. DIETRICH has been appointed director, sales (parts and special products) and member of the company's executive committee.

Since 1955, Mr. Dietrich has been director of marketing and general sales manager of Kiekhaefer Corporation, Fond du Lac, Wis. Prior to joining Kiekhaefer, he was with the Ford Motor Company for nine years.

M. C. Dietrich

R. E. Hess

ROBERT E. HESS has been named general manager of ABC Scale Division, McDowell Company, Inc., Cleveland, Ohio.

Mr. Hess was previously national sales manager, industrial sales division, of Fairbanks, Morse & Co.

CHARLES R. HAUTH has been appointed assistant manager, technical sales, for Harbison-Walker Refractories Co., Pittsburgh, Pa.

Mr. Hauth joined Harbison-Walker's research department in 1948, and has served in general sales in Pittsburgh, as sales engineer in the Chicago district sales office, and more recently with technical sales in Pittsburgh.

W. O. RICKARD has been named district sales manager of mechanical goods in the Detroit branch of United States Rubber Company. Mr. Rickard, whose appointment was effective September 1, will be responsible for mechanical goods sales in a territory covering the southern peninsula of Michigan and 19 counties in Ohio. He previously served as assistant district sales manager at the Pittsburgh branch.

JOSEPH ALBIEZ, general sales manager, Flygt Corporation, announces the appointment of EDWARD J. DUNCAN to the post of eastern regional sales manager.

Election of ROBERT R. LUCAS as secretary-treasurer of The S. K. Wellman Company, Bedford, Ohio, has been announced.

Prior to joining Wellman, Mr. Lucas was assistant to the president, Pittsburgh Chemical Co., Pittsburgh, Pa.

EDWARD F. NELSON, with Oliver since April, 1951, has been appointed sales manager in the Indianapolis territory by Oliver Corporation, Chicago, Ill.

Mr. Nelson, who has been headquartered at DeWitt, Iowa, succeeds E. C. HOOD, who has been transferred to the Peoria branch sales area.

HAROLD B. EWOLDT has been appointed to the position of truck specialist, sales, for the LeTourneau-Westinghouse Company, Peoria, Ill. He has had more than 30 years of experience in the construction and mining profession.

WILLIAM WADE has been elected a vice-president of Acme-Hamilton Manufacturing Corp., New York, N. Y., and technical director of the industrial rubber manufacturing firm.

Prior to joining Acme-Hamilton in 1954, Mr. Wade was in the technical department of the U. S. Rubber Co. at Passaic, N. J., for 19 years.

RICHARD B. WINDHORST, sales manager of the St. Louis sales division of Bemis Bro. Bag Company, has been appointed product supervisor for textile and waterproof products, with headquarters at the Bemis general sales department in St. Louis.

NORMAN P. UFFMANN, product sales manager of the St. Louis specialty department, succeeds Mr. Windhorst as sales manager of the St. Louis sales division.

GERALD W. MURPHY succeeds Mr. Uffmann as product sales manager of the specialty products department.

TRIAL SAMPLES
Of World-Famous WHITMORE'S Lubricants

OPEN CHAIN LUBRICANT INCREASES CHAIN LIFE UP TO 300%

Penetrates, lubricates, prevents rust. Lubricates deep into chain linkage to reduce friction on pins, rollers, bushings, pressure surfaces. Corrosion inhibitor prevents rust in vital working mechanisms. Lubricates close-tolerance internal surfaces to increase chain life up to 300%. Highly recommended for all climatic conditions to stop rust and corrosion even in salt atmospheres.

Packaged in handy 16 oz. aerosol spray-on containers or in bulk — send for a free trial sample.

ANTI-FRICTION COMPOSITIONS HAVE NO MELTING OR DROPPING POINT

Packaged in 14½ oz. cartridges for handy application with lever-type cartridge guns for constant protection to roller, ball, sleeve bearings and sliding surfaces in "hot" bearing applications or in areas with high ambient heat. Exclusive formulas have no melting or dropping point; moisture resistant; will not wash out; exceptional metal adherence properties; temperature reducing qualities; high extreme pressure values. Available in two grades. Whitmore's Anti-Friction Composition No. 1 (light density), recommended for high speed, high temperature applications. Anti-Friction Composition No. 2 (heavy density), for low-speed high-temperature applications or loosely-fitted bearings. Specify No. when requesting free trial sample.

68 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Open and Enclosed Chain
- Speed Reducers
- Enclosed Gear Cases
- Roller, Ball and Sleeve Bearings
- Wire Rope and Cable
- Hydraulic Units, Torque Converters

Est. 1893
THE WHITMORE MANUFACTURING CO.
LUBRICATING ENGINEERS
CLEVELAND 4, OHIO • VULCAN 3-7272

Enter 193 on card, page 181

Self-loading clay overburden into 15 yd scraper, Michigan reaches spill-point in slightly over 1 minute. Total time for typical 4200 ft cycle, 6.7 minutes.

Big 4½ yd Tractor Shovels slash loading costs at Midwest pit, also pay off on unusual jobs

Michigans self-load scrapers,

Perhaps the most *unexpected benefit* of big Michigan Tractor Shovels is that their power, capacity and weight are helping them do jobs previously considered much too tough for any kind of loader.

The experiences of Crystal Lake Trucking & Excavating Co., Algonquin, Illinois, operated by brothers Bill, John and Herbert Pfeifer, provide an excellent case in point.

Outproduces 4 yd dragline

Besides dramatically slashing truck-loading costs, one of this company's four Model 275A Michigans has out-produced a big (4 yd) dragline on hopper-feeding assignment. The 4½ yd Michigan moves material faster and at less cost than any other method, according to company president Bill Pfeifer. And it keeps production high even when stone has to be brought from stockpiles scattered 200 ft and more away. Bucket loads average 6 tons; haul speed, 7 mph; return, 14 mph.

Doubles scraper output

Another of Crystal Lake's 290 hp Model 275 A's equipped with double-drum cable-control, *self-loads* a 15 yd scraper to strip overburden. "Michigan power plus its 14 to 28 mph speed give us twice the production on typical 2000 ft hauls as crawler prime movers," says Mr. Pfeifer. "Its big tires have ended our worries over track wear. And because its mobility permits quick shifting to scraper work when loading demands slacken, we've eliminated the expenses of a separate tractor."

Truck-loads 18,000 tons daily

Savings are substantial too on truck-loading assignment. Three passes and 60 to 90 seconds heaps a typical 15 yd hauler . . . *one-third to one-half the time formerly needed by Crystal Lake's 1¾ yd Tractor Shovel.* In a 10-hour day, each of the three 4½ yd Michigans has loaded as much as 6,000 tons of sand, gravel and stone. Costs, based on national ownership and operating averages, are under 2.7 cents per ton.

Carrying crushed stone, Michigan averages 6 tons per bucket-load. In 3½ hours, unit will haul 2000 tons to washer hopper.

speed dragline-type feeding

How about your layout? Can this speed and power help cut costs on your loading, digging or towing jobs? Or do you need more (or less) than 262 hp, 4½ yds; and 48,000 lbs of weight? We have it . . . nine job-proved Michigan models, 42 to 335 hp; the biggest one, 62,000 lbs strong, takes buckets from 6 to 12 cubic yards. Call us for detailed specs, prices . . . and a no-obligation demonstration.

Loading typical 15 yd hauler takes the 4½ yd Michigan 1 to 1½ minutes.

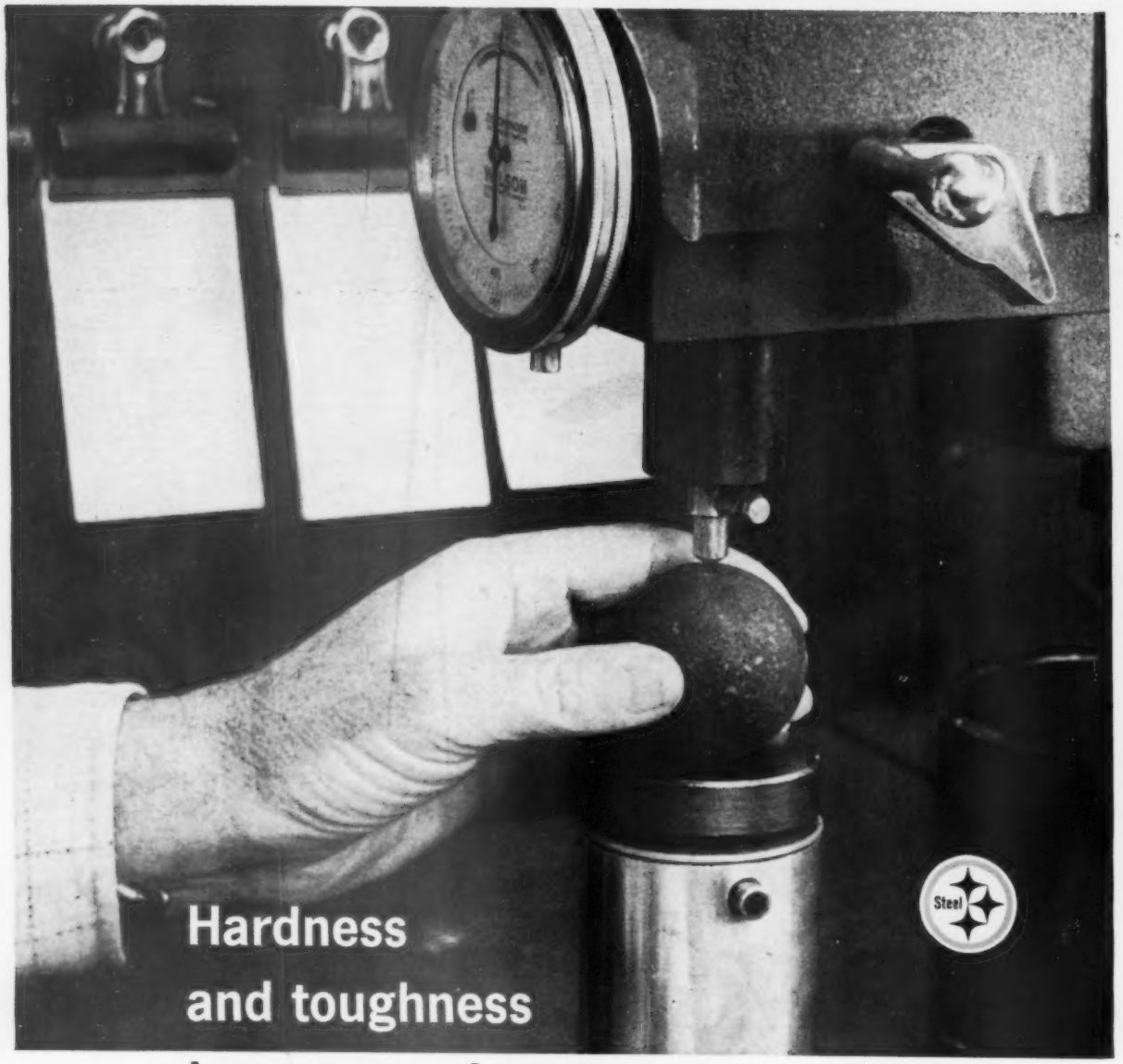
Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

2479 Pipestone Road
Benton Harbor 42, Michigan

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

Enter 194 on card, page 181



have earned customer acceptance

Hard. Tough. Consistently uniform, right down to the core. Those are the qualities that have sold more than a million tons of Sheffield Grinding Balls. They've proved their dependability on every kind of grinding job, all over the world. Moly-Cop Balls keep their sphericity longer, give a better grind at a lower cost per ton. That's because Sheffield alloying, heat-treating and forging are kept consistently uniform, too . . . by constant quality control. **Sheffield Plants: Houston • Kansas City • Tulsa**

SHEFFIELD
MOLY-COP
Grinding Balls

ARMCO Sheffield Division

Globe Rubber Works, Inc., 11 Newbury St., North Quincy, Mass., has been appointed New England distributor of a wide range of industrial products made by United States Rubber Co.

FORREST D. THOMAS has been appointed Midwest sales engineer for the Lipe-Rollway Corp., Syracuse, N. Y., manufacturer of heavy-duty clutches for truck, tractor, bus and industrial use. He replaces THOMAS KENNY, who is retiring.

Prior to this appointment Mr. Thomas was employed for 16 years in the physical and electrical test unit of motor truck engineering of the International Harvester Co., Fort Wayne, Ind.

Pangborn Corporation, Hagerstown, Md., has appointed JOHN V. HAIDER manager of its Pittsburgh sales district. Previously sales engineer, he succeeds JOHN D. WISE who retired recently after 14 years as Pittsburgh district manager.

MELVIN R. PRICE has joined Pangborn Corporation as sales engineer, Pittsburgh district. He had been employed at the George B. Stewart Company.

The appointment of Process Equipment Engineers, Plainfield, N. J., as representative for the Lehigh Fan and Blower Division of Fuller Co., Catasauqua, Pa., has been announced. The firm will handle both sales engineering and customer service for Lehigh. The offices are located at 638 Valley Rd., Watchung. The sales area covered by Process Equipment will include New Jersey, New York, and western Connecticut.

EUGENE R. CRANDALL has been appointed manager of the mullite operations, Shelton, Conn., works, of the Refractories Division, H. K. Porter Company, Inc., Pittsburgh, Pa.

Prior to joining Porter Mr. Crandall was with American Refractories and Crucible Corp. in various capacities, and before that with the Mullite unit as chief engineer and in research engineering and technical sales.

WHEN YOU HAVE
BLASTING TROUBLE
HERE

HERE'S THE ANSWER
TROJAN WR EXPLOSIVES

Trojan WR (non-headache) explosives are used for wet work and hard, tight shooting. Improved fragmentation! Controlled throw! Clean breakage! No propagation between holes or rows of holes as with nitroglycerine explosives. Simply trouble-free, cost-cutting results. Available in 20% to 70% strengths in diameters ranging from one inch through three inches. Good fumes! Send for bulletin.

TROJAN POWDER COMPANY

17 North 7th St., Allentown, Pa. Plants: Allentown, Pa. Wolf Lake, Ill. San Leandro, Calif. Sales offices and magazines in principal consumer districts. *Originators of first successful non-headache dynamite.*

HIGH EXPLOSIVES • BLASTING AGENTS
SEISMIC EXPLOSIVES • PERMISSIBLES
CUSTOM-DEVELOPED EXPLOSIVES TO MEET SPECIAL REQUIREMENTS •
BLASTING SUPPLIES

TROJAN *Explosives*

Enter 197-A on card, page 181

Regardless of the vibrator you use . . . the payoff in high tonnage is in the screen section.

Cleveland wire screen sections are custom woven for accuracy of opening, ductility, minimum wear and maximum strength to deliver high tonnage and long screen life. They resist abrasion and fatigue and minimize equipment downtime.

Get maximum production and long life . . . call Cleveland for your next woven wire screen order.

THE CLEVELAND WIRE CLOTH AND MANUFACTURING COMPANY

CLEVELAND WIRE CLOTH

3574 EAST 78th STREET
CLEVELAND 5, OHIO
PHONE DI 1-1832

Enter 197-B on card, page 181

Pit and Quarry's Research Director Jim Kostka examines the new Portland Cement Plant Map as it arrives from the printer.

JUST ARRIVED!

Newest Portland Cement Plant Map

Our latest edition of the popular PORTLAND CEMENT PLANT map is as new as tomorrow. It shows all the existing producing and distributing plants in the United States, Canada, Mexico and Puerto Rico, plus all plants under construction and expected to be completed by the end of 1962.

This new 33 x 44 inch map names and locates 227 producing and 116 distribution plants. It is priced as follows:

1—10 copies	$1.00 per copy
11—25 copies	.75 per copy
over 25 copies	.50 per copy

Please send a check or cash when you mail your orders; this will eliminate future billing.

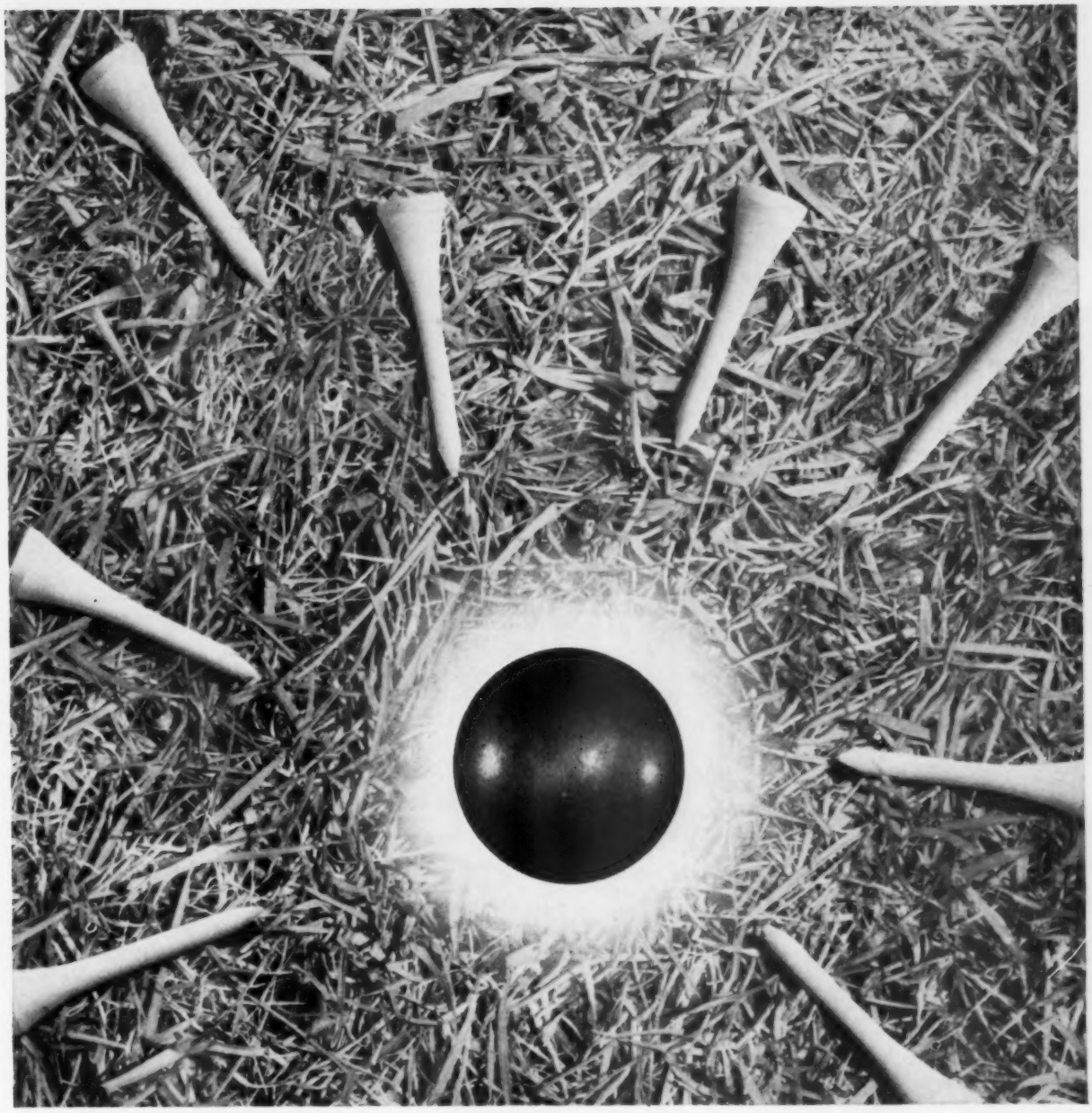
We will be happy to fill your order.

FEATURES OF NEW CEMENT PLANT MAP

- Alphabetical listing, by city and state, for each producing and distributing plant.
- Capacity given for each producing plant. Future capacities given, too, when available.
- Plant's process, wet or dry, is indicated for each producing plant.
- Brand name, or names, shown for each producing plant.
- All producing and distributing plant locations shown on an outline map.

PIT AND QUARRY PUBLICATIONS, Inc.

431 S. Dearborn St. Chicago 5, Ill.



Tee'd off about grinding balls?

Then call that old pro, your CF&I salesman. *He* can supply grinding balls that will give you a better score and keep your mill throughput up and your blood pressure down.

Made from forged alloy or carbon steel, every CF&I Grinding Ball is up to par—outstanding resistance to wear and impact splitting . . . exceptional uniformity of roundness, density and other physical properties. CF&I Grinding Balls are available in the following diameter sizes: Forged Alloy Steel — 1½" to 4"; Forged Carbon Steel — ¾" to 5". No matter which you choose, you're going to be down the middle of every fairway and putting for a birdie. 8200

Other quality CF&I Steel Products for basic industries
Grinding Rods • Mine Rails and Accessories • Rock Bolts • Realock
Metallic Fabric • Industrial Screens • Wickwire Rope • Grader Blades

The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales Offices in Key Cities

DISTRIBUTOR DAN, the SKF bearing man, offers

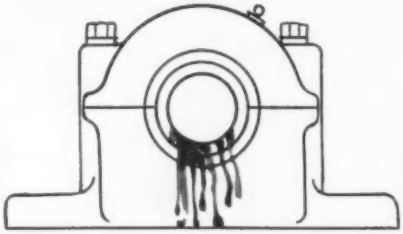
FIVE TIPS ON BEARING LUBRICATION

—that can save time and trouble for you

WHEN TO RE-LUBRICATE? Always follow the manufacturer's directions, if they're available. Most bearings, whether oil- or grease-lubricated, need cleaning and re-lubrication once a year. Re-lubricate oftener if the bearing is large, operates at high speeds or temperatures of 120-140 F. or higher

WHAT GREASE CAN TELL YOU. Grease itself can tell you when cleaning and re-lubrication are needed. Dark grease means that oxidation has started or that abraded particles are present. Changes in the original color indicate water Grease of a hard consistency should always be replaced.

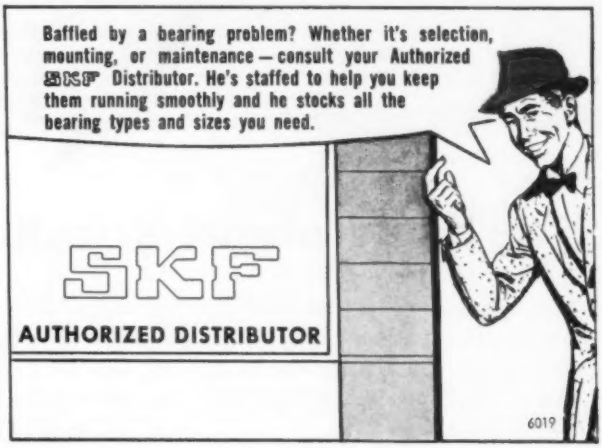
WHEN TO CHANGE OIL. Compare the oil in the bearing with unused oil. Clouded oil indicates water. Dark oil frequently indicates sediment. Dark, pitch-like coatings on the rings, roller ends or cage mean the oil has become dirty or begun to carbonize. So, clean the bearing and housing and re-lubricate



TOO MUCH IS WORSE THAN TOO LITTLE. Don't overlubricate. Only grease that actually contacts the bearing lubricates. Using too much grease may cause churning and lead to overheating and loss of lubricant. Remember: the higher the speed, the more sensitive a bearing becomes to excessive lubrication.

CLEANLINESS, FIRST AND LAST. Clean new oils and greases will usually force-out old lubricants in the bearings. But they won't if the lubricant is badly oxidized. Pour a hot aqueous emulsion into the housing. Rotate shaft until bearing is clean. Drain solution while rotating shaft. Then, flush with hot light oil, drain and add new lubricant.

Baffled by a bearing problem? Whether it's selection, mounting, or maintenance — consult your Authorized SKF Distributor. He's staffed to help you keep them running smoothly and he stocks all the bearing types and sizes you need.



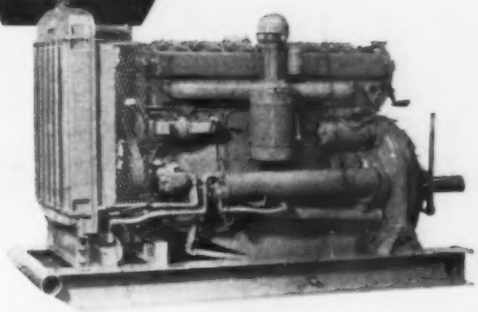
SKF MOTION ENGINEERING

Advanced ball and roller bearing technology

Two letters to remember in diesel engines and generator sets...

THE MP SERIES

MURPHY DIESELS



Here's the **MP** *Series Line-up*

MP SERIES ENGINES AND POWER UNITS—105 HP to 420 HP, 1200 and 1400 RPM.

MP SERIES DUAL FUEL ENGINES—147 to 242 HP.

MP SERIES GENERATOR SETS—70 KW to 227 KW.

MP SERIES MECH-ELEC UNITS for delivering mechanical or electrical power separately or simultaneously.

MP SERIES MARINE ENGINES AND AUXILIARIES—105 HP to 420 HP.

The 48-page booklet entitled "Before You Power a Job . . ." gives detailed information on MP Series Murphy Diesels. Ask your Murphy Diesel Dealer for a copy, or write direct. There's no obligation.

Deliver More Power Into the Job to Make More Profit for You

The power put into the job—not the power on the job, is the power that pays off for you. Engine reaction to load changes and speed changes determines the power that actually goes into the job. Only an engine with high rising torque can put more power into the job when needed.

MP Series Murphy Diesel engines are designed and built to deliver More Power into the job—the kind of *usable, hard-working power* you need. With high rising torque, they have the ability to take hold of a load and really hang on. This helps keep your equipment at the right operating speed for efficient production and More Profit. And remember, each day's production is determined by the *total power* put into the job that day.

To put MP Series Murphy power in your job, put Murphys on your job. You'll see the difference in your profits. Ask your Murphy Diesel Dealer for full information on the MP Series today.

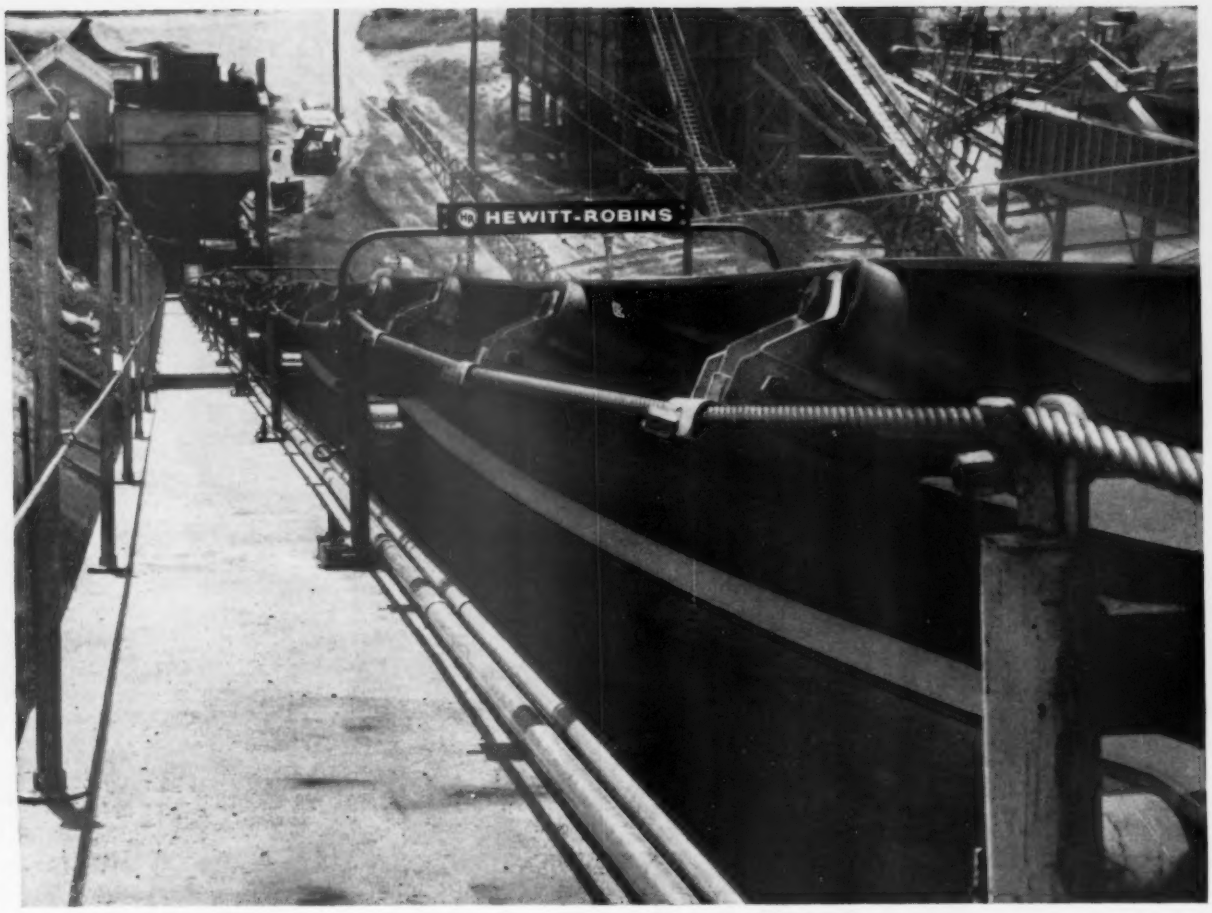
MURPHY DIESEL

433-RO

MURPHY DIESEL COMPANY

5307 W. BURNHAM ST., MILWAUKEE 19, WISCONSIN

Sales, service and parts throughout the nation



Down go your costs
with an H-R Wire Rope Conveyor!

Here is the simplest, most efficient conveyor construction you could imagine . . . an H-R wire rope conveyor. The initial cost is significantly less than other constructions. New H-R Style L idlers (pat. pend.) and wire rope design allows 13% greater load-carrying capacity, absorbs shock and impact, and thus increases belt and idler life and lessens spillage considerably.

Engineering costs are kept to a minimum because H-R modular designed components fit together like building blocks. This allows greater flexibility in selecting a conveyor for a specific application without intricate engineering.

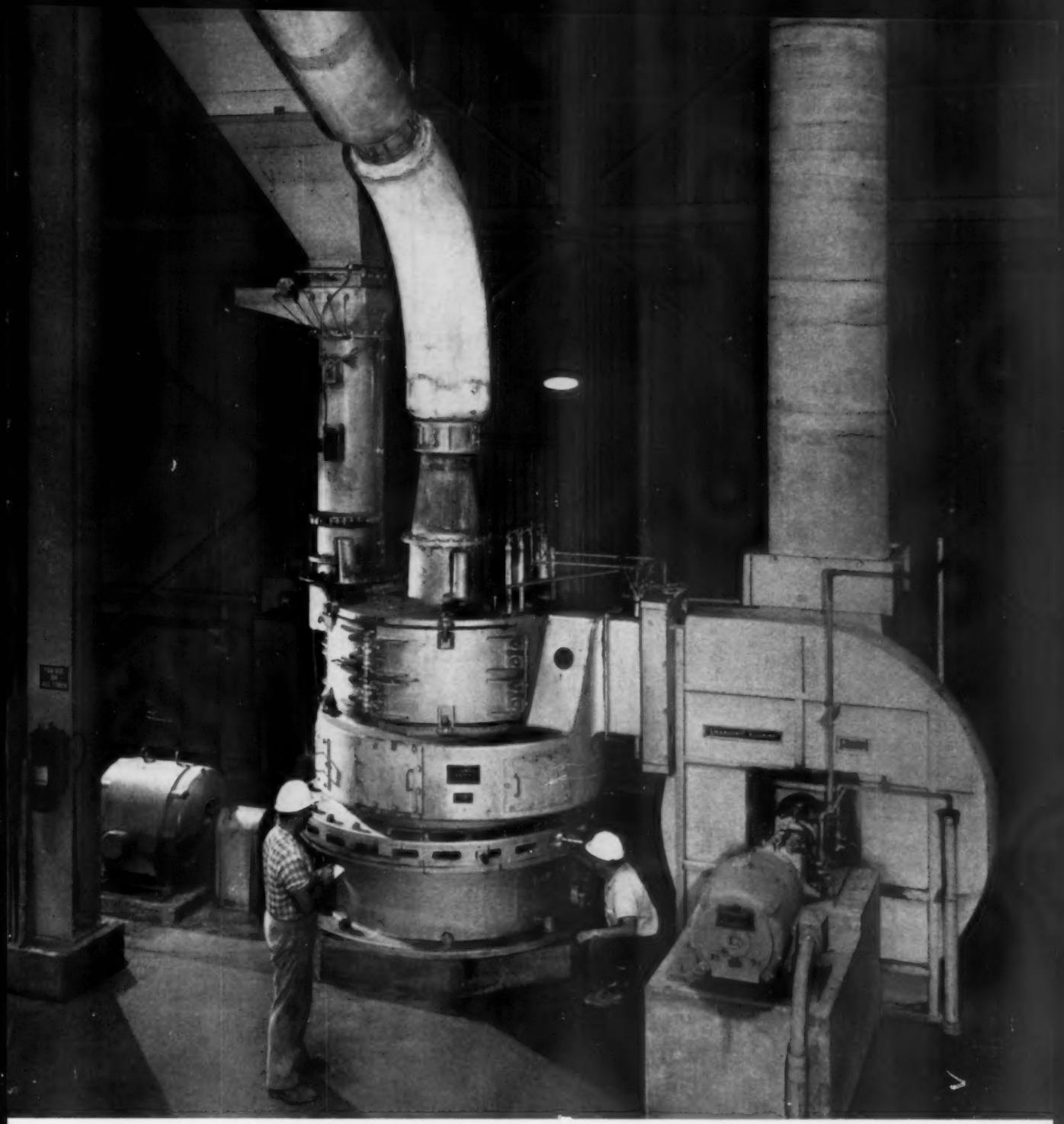
Another point in your favor; H-R is the only manufacturer of *both* belt and major machinery components of a conveyor. This single-source responsibility is your best assurance of quality.

See an H-R wire rope conveyor in action . . . above or below ground; call your H-R field engineer, or write Hewitt-Robins, Stamford, Connecticut to arrange an inspection tour.

Write for complete facts, installation data. Bulletin 11-24

HEWITT-ROBINS

Conveyor Machinery and Belting • Power Transmission
Hose • Processing Equipment • Engineering Services



Latest score at Lehigh Portland Cement Co. Production: 1,512,000 bbl. Pulverizer maintenance: $0.

Twenty-four hours a day, fourteen months in a row, a B&W pulverizer has been grinding it out for Lehigh Portland Cement Co., Alsen, N. Y.

During this time, the direct-fired 11½ x 400 ft. rotary kiln has produced 1,512,000 barrels of cement. The B&W pulverizer feeding the kiln ground and dried more than 30,000 tons of bitumious coal. In spite of this rugged duty, the pulverizer has required no maintenance.

Maintenance is low because of the wear resisting materials used. The rings are manufactured from B&W's exclusive Elverite C alloy. The balls are heat treated alloy steel.

Grinding elements maintain full contact throughout their lifetime, resulting in maximum fineness and greater production. The B&W pulverizer has helped Lehigh achieve an exceptionally low kiln coal rate.

The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

Babcock & Wilcox

HAYWARD CLAMSHELL BUCKETS

**WORK LONGER,
WORK FASTER,
WEAR LESS!**

Designed with rugged, one-piece alloy shells... wide type, cast manganese steel cutting edges... smooth shell interior for fast, capacity loads and easy discharge... manganese bushings... diagonal truss brace to keep shell in line... has no side sway or back lash... *plus many other cost-cutting design features!*

Get complete details. Write today for illustrated bulletin.

THE HAYWARD COMPANY

50 CHURCH STREET, DEP'T P, NEW YORK 7, N. Y.

Builders of Better Buckets Since 1888

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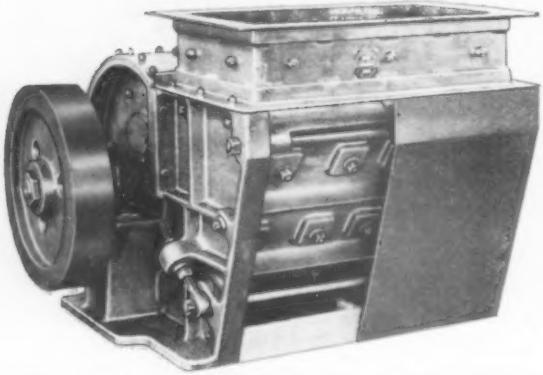
American's 30 SERIES HAMMERMILL



for high volume reduction with minimum maintenance rely on hammermills backed by American's 50 years of experience.

Write for American's bulletin **BETTER STONE CRUSHING**

American **PULVERIZER COMPANY**

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

1059 MACKLIND AVE. ST. LOUIS 10, MO.

Enter 204-B on card, page 181

CLAYTON F. ENGLISH, 55, executive vice-president and treasurer of Sturtevant Mill Company, Dorchester, Mass., has been elected chairman of the board, succeeding WILLIAM T. DOYLE, 74, who retired in June after 57 years with the company. Mr. English will continue to serve as executive vice president and treasurer. Mr. Doyle will remain on the Sturtevant board.

Mr. English, who joined Sturtevant in 1947 as production manager, became executive vice-president in 1957. He was named treasurer in 1958, succeeding the late Joseph L. Sturtevant. Prior to joining the Massachusetts manufacturer of dry processing equipment, Mr. English held a management post with the Shipbuilding Division of Bethlehem Steel Company.

GUY J. COFFEY has been elected chairman of the board and chief executive officer of Chicago Pneumatic Tool Company, New York, N.Y. He succeeds J. ARNOLD JACKSON who will continue as a director and chairman of the executive committee.

NORMAN READMAN has been elected president to succeed Mr. Coffey. Mr. Readman was formerly managing director of all overseas operations.

THOMAS F. NOONAN was elected vice-president and comptroller.

CARRA L. LANE was elected vice-president and manager of plant operations.

The appointment of ROBERT A. BADDERS as a nation-wide sales engineer assigned to the heavy-duty brake program at the Bendix Products Division, The Bendix Corporation, South Bend, Ind., has been announced.

He had been a fleet sales representative for the Clark Equipment Company, Buchanan, Mich., where he specialized in air suspension systems, trailer axles, and brakes.

Meissner Engineers, Inc., has announced the appointment of EUGENE A. BARTKUS to the position of vice-president, research and development. Mr. Bartkus has been with the firm for 10 years.

Enter 205 on card, page 181 →

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R. P. PERRY, manager of the Minneapolis plant and sales division for Bemis Bro. Bag Company, St. Louis, Mo., has been appointed to the newly created position of director of product development. In his new appointment Mr. Perry will report directly to the president. He will maintain headquarters in Minneapolis.

DEXTER A. CLARKE, manager of the plant and sales division in Indianapolis, will succeed Mr. Perry in the Minneapolis managership.

K. W. KOECHIG will succeed Mr. Clarke as Indianapolis manager. He has been assistant to the manager there since April, 1959.

Five changes in management personnel at Leeds & Northrup Co., Philadelphia, Pa., manufacturer of automatic controls, measuring instruments and furnaces, were announced recently.

DONALD E. MOAT, presently vice-president and director of marketing, becomes vice-president, government and foreign relations. JOHN F. QUEREAU, presently vice-president and director of manufacturing, becomes vice-president and director of marketing.

ELWOOD F. ROGGE, presently manager of the North Wales plant, becomes director of manufacturing. J. FREDERICK SCHOCK, presently manager of the order control division, becomes in addition local manager at North Wales. WILLIAM M. FEELEY, presently head of the plant engineering and maintenance section, becomes manager of the plant engineering and services division.

SCHAEFFER E. SPECHT has been appointed general sales manager for the Buell Engineering Company, New York, N. Y.

In his new capacity, Mr. Specht will supervise all sales operations for Buell and its Northern Blower Division in Cleveland, Ohio. He was formerly western district sales manager.

The promotion of SELDEN A. STONE to drill sales manager has been announced by Bucyrus-Erie Co., South Milwaukee, Wis. He succeeds GEORGE D. GRAYER, who has been appointed sales manager of the company's newly formed midwestern region.

FRANK J. BEDNARCZYK has been named chief quality engineer for SKF Industries, Inc., Philadelphia, Pa.

JOHN C. CROUCH has been elected vice-president of The McKay Company, manufacturer of chains, welding electrodes, and wires in Pittsburgh, Pa.

Prior to his election, Mr. Crouch served as assistant secretary and personnel manager, and he will continue as assistant secretary. Mr. Crouch joined The McKay Company in 1936 as assistant controller.

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24" x 14", 30" x 14", 40" x 16" A.C Style "B"

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2', 3', 4', 5½, 7 Symons Cone Crushers
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3' x 4' CWI 5' x 5' Allis Chalmers
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5' x 22" Air Swept Complete Setup New 1951

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Two—24" x 30' McLanahan dbl Log WASHERS
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36" x 48" Traylor Bull Dog Crusher
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20" x 36" Universal Jaw Crusher
36" Symons Short Head Crusher
24" Telsmith Gyrosphere Crusher
32" x 40" Telsmith Gyratory Crusher
16" Telsmith Gyratory Crusher
22" x 40" Cedar Rapids Rolls
36" x 15' Stephens Adamson Feeder
30" Feeder

Blue Ball Machine Works
Blue Ball, Penna.

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• **SELLING**
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Broadcast Section

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8—BRADLEY GRIFFIN MILLS, 30" & 40".
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2—Raymond 16' and 14' dia. single whizzer.
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1—8" type B with 75 HP motor.
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1—Link Belt Pan Conveyor, 36" wide x 70'6" long, 1⅛ HP.
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1—Jeffrey 20" x 25' troughing conveyor.
1—Jeffrey Traylor 24" x 48" Pan Feeder.

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4—IR Imperial Compressors 884 cfm @ 100 PSI.
3—IR Imperial Vacuum Pumps 4188 cfm.
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15—Bucket Elevators 16-49' c.c., continuous and centrifugal discharge, steel casings, drives and motors.
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20—Steel Hoppers and Bins, 30' x 12' x 15' to 6' x 10' x 12' structural steel supports.
Apron Feeders, Bucket Elevators, Screw Conveyors, Motors, Structural Steel, etc.

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Insley K-12 Dragline	American 375 Dragline	Diamond Mod. 96 Crush'g Plant

This equipment located in our plant. Come See It!

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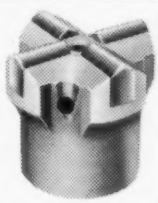
(Tungsten Carbide Inserts)



Four point, cross pattern, "H" thread, side hole. Manufactured by TIMKEN. Unused. Value $15.00 @. Your choice of two sizes.

1½" and 1⅝"

No. O-947 Per dozen (Postpaid) $84.00
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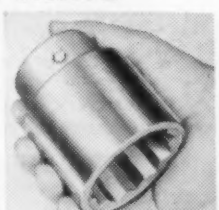

1" square drive, 12 point sockets in these size openings:

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All New, Unused in perfect condition. Made by SNAP-ON, or equal. $9.00 values. Shpg. wt. 3 lbs. each. F.O.B. Chicago.

No. O-946 Each (any size!) $2.50
(All above sizes—$10.00!)

NOTE: We also have other size sockets in stock—such as ½" drive, ¾" drive, etc. Send us your requirements. Best prices!

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25x42"—20x36"—15x24"—Jaw Crushers
5'x22' Tube Mill with Motor—Good
HI-side 5-roller Mill with Whizzer
Complete Sand Mine Installation
Wheel Pettibone Speedloader with cab
4'x12' Double or Triple Deck Screens
140 & 125 HP, 125# Boilers—EXCELLENT
25-40-75 & 125 HP Motors TEFC—TRY US

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Concrete Plant Complete consisting of:
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2 Cement Bins—5000 bbls. & 1200 bbls.
372 ft. 30" Belt Conveyor
Bucket Elevators, Screw Conveyors & Complete Automatic Controls.
Concrete Plant is One Year Old

GULL CONTRACTING CO., INC.
&
L. G. DeFELICE & SON
33-15 Lawrence St. Flushing, N. Y.
LEnox 9-7000

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50 Ton Amer. #3046 Stiffleg Derrick, 130' Boom, 45' Mast.
30 Ton Wiley Stiffleg Derrick. 60' BM.
20 Ton Amer. Stiffleg Derrick. 96' BM.
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200 HP Amer. #180 3D Elec. Hoist.
40 Ton Amer. #408 Diesel Loco. Crane.
45 Ton Gen. Elec. Diesel Elec. Loco.
80 Ton Gen. Elec. Diesel Elec. Loco.
1500 HP Alco Diesel Elec. Locomotives.
1 Yd. Lorain L50 Diesel Crane. 60' BM.
1600 CFM Chic. Pneu. YCE Air Compressor.

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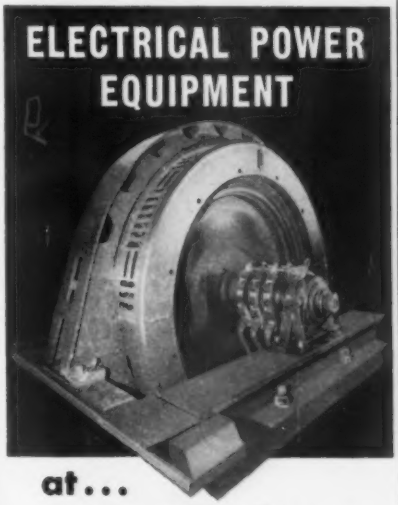

at...
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TRANSFORMERS • HOISTS • COMPRESSORS

Chicago Electric also carries complete stocks of rebuilt units needed for improving facilities, increasing capacities and setting up new installations at substantial savings.

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SLIP RING MOTORS

HP	RPM	MAKE	VOLTS	TYPE
2500	257	G. E.	6600	MT-28
1000	1200	Al.-Ch.	4000	ANY
1000	900	Al.-Ch.	2300	ANY
700	720	G. E.	440	I-M
600	1800	G. E.	4160	M-6345
500	1200	G. E.	440	M-6345Z
400	1200	West.	2300	CW
400	720	G. E.	440	MT-573Y
350	1800	Al.-Ch.	2300	ANYW
300	900	G. E.	440	IM-17

MOTOR GENERATOR SETS

KW	MAKE	A.C.V.	D.C.V.
1750	G. E.	4160/2300	250/300
1250	West.	4160/2300	250
1000	West.	4160/2300	250
750	G. E.	4160/2300	250
600	G. E. (3 unit)	2300/440	125/250
500	G. E.	2300	250
400	Al.-Ch.	2300/440	125/250
250	G. E.	2300	250
200	G. E.	2300	250
150	West.	440	250

D.C. MOTORS

HP	RPM	MAKE	VOLTS	TYPE
1500	300	West.	250	TEFV
850	250/500	West.	250	QM
600	250/500	G. E.	600	DBL.ARM.
500	210	G. E.	250	MCF
400	1150	REL.	250	T-1970
400	300/900	G. M. (2)	250	D4D
300	575/1150	West.	250	CB-500
200	700	West.	250	SK-201
150	380/1000	G. E.	250	MCF
150	1150	G. E. (2)	250	RC-37

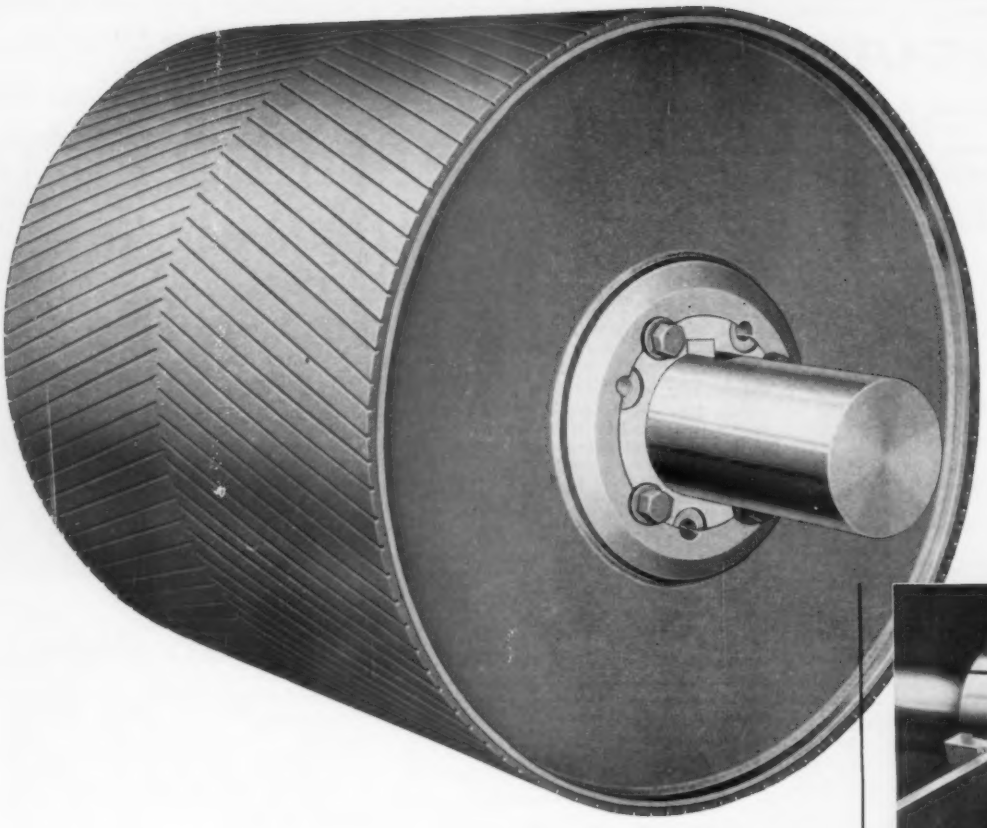
Write for current complete stock lists on electrical power equipment you need or send your list of surplus and used equipment for our offer.

50 YEARS 1910 - 1960 SERVICE TO INDUSTRY

Phone CAnal 6-2900

CHICAGO *Electric Co.*

1329 W. Cermak Rd., Chicago 8, Ill.



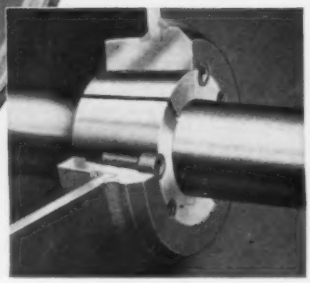
AMERICA'S NO. 1 STEEL CONVEYOR PULLEY!

There are more Taper-Lock Steel Conveyor Pulleys than any other operating on big jobs. Why? Simply because of the dependable performance they deliver under the toughest conditions.

The rims, discs and hubs are *steel* — and they are fused together into jointless drum construction for (1) maximum strength with minimum weight, (2) exclusion of dirt, water and steam, (3) terrific shock resistance. Every weld is made by the submerged arc process giving deep penetration and exceptional strength. Rims are accurately die formed in the smaller diameters and rolled in the larger diameters. Pulleys with 26″ and wider faces have interior discs that add to the trueness, rigidity and strength of the rims.

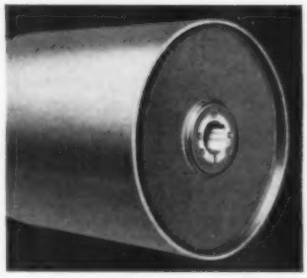
Dodge offers the world's biggest range of stock sizes. Diameters from 6 inches to 8 feet — all face widths, crowned or flat. Standard or special rubber lagging available. Ask your local Dodge Distributor — or write us for a technical bulletin.

Dodge Manufacturing Corporation, 4000 Union Street, Mishawaka, Indiana



No "walking" on the shaft with Taper-Lock. Full length contact of hub. Holds under heavy loads and shock. Easy on — easy off.

Patented Back-up Bars give full rim strength through 100% weld penetration. Diametrically opposed bars insure balance.



Jointless construction creates a drum fully sealed against conveyed materials of all kinds as well as dirt, water and steam.

The Products with the Pluses... **DODGE**

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the white pages of your phone book. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods.

THIS MARION HAS LOADED 500 YARDS OF LIMESTONE AN HOUR....

When it needed to. And, that's the point. Even though the average production in this southwestern quarry is set at a somewhat more moderate pace, it's significant to note this Marion 112-M electric shovel, with a 4½ yard dipper, has the ability to produce at peak efficiency when called upon to do so. In that respect it is similar to all the machines in Marion's continually growing line of excavators. It's a point to remember when you consider the purchase of your next loader.

MARION POWER SHOVEL COMPANY • MARION, OHIO

A Division of Universal Marion Corporation

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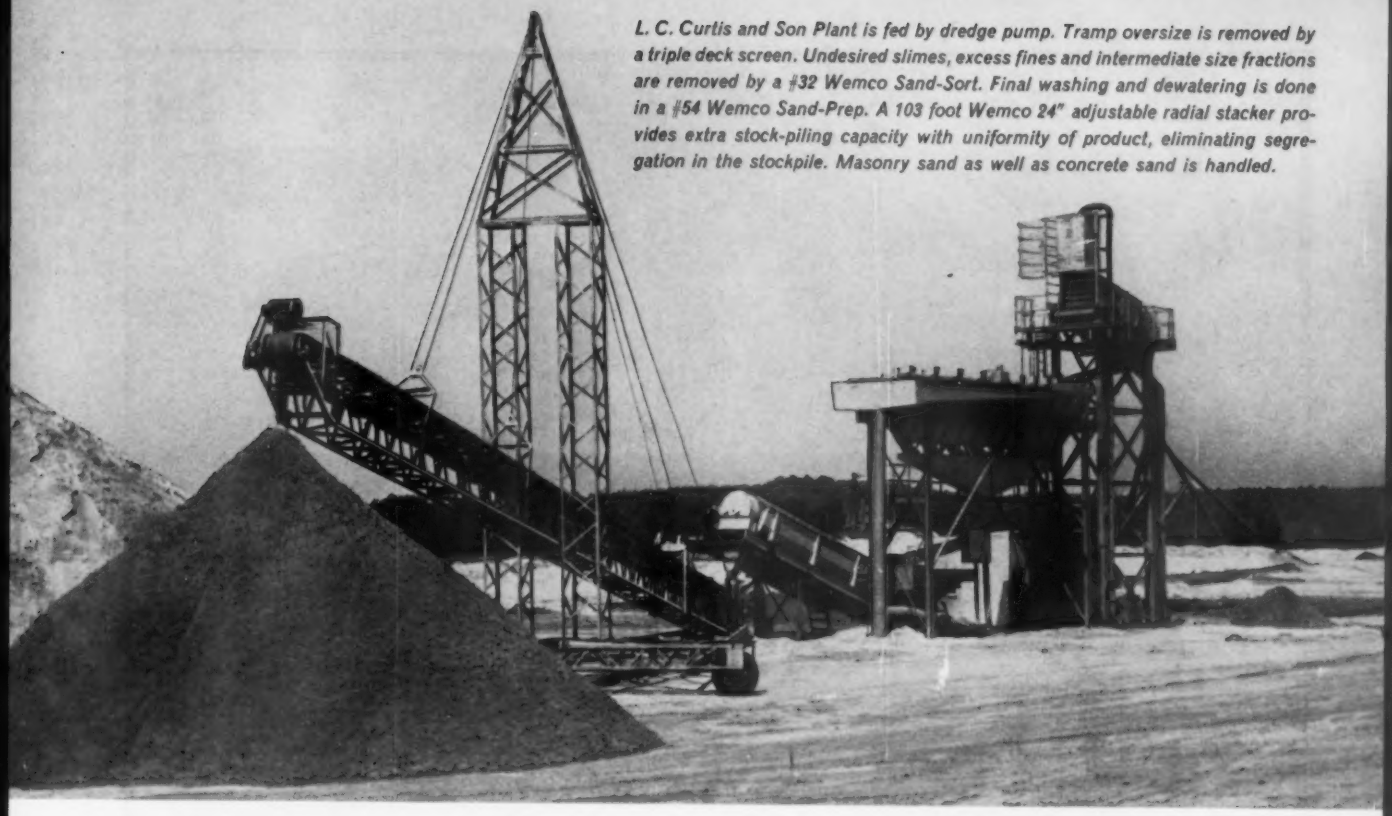


L. C. Curtis and Son Plant is fed by dredge pump. Tramp oversize is removed by a triple deck screen. Undesired slimes, excess fines and intermediate size fractions are removed by a #32 Wemco Sand-Sort. Final washing and dewatering is done in a #54 Wemco Sand-Prep. A 103 foot Wemco 24" adjustable radial stacker provides extra stock-piling capacity with uniformity of product, eliminating segregation in the stockpile. Masonry sand as well as concrete sand is handled.

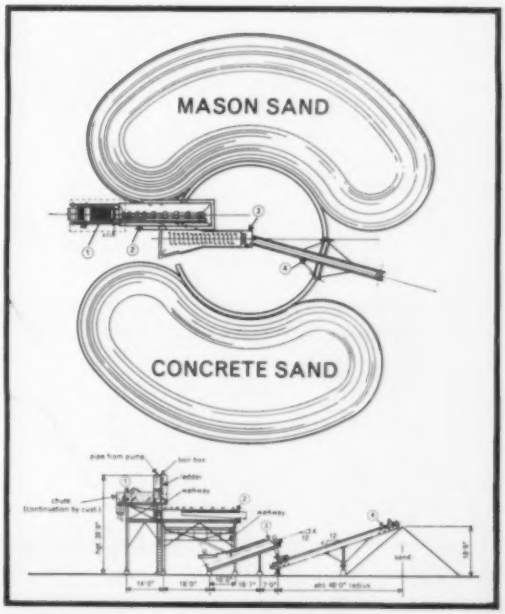
WEMCO TOTAL PERFORMANCE ENGINEERING gives maximum production and efficiency—at less cost

There are two good reasons for the success of the L. C. Curtis plant at Watkinsville, Georgia: a progressive policy meeting existing market requirements as well as anticipating future specification changes and use of advanced plant engineering and equipment.

The WEMCO engineered plant flow scheme provides an extra measure of efficiency, flexibility and cost savings vital to profitable operations. These are insured now and in the future by WEMCO's TOTAL PERFORMANCE CONCEPT which includes:

1. **Pre-planning**—Designing the plant to fit the deposit and the plant site.
2. **Total performance engineering**—Use of latest processing and handling methods including components sized to do the job.
3. **Total performance operation**—A plant complete in every respect, giving maximum production for dollars invested while meeting present needs, yet flexible enough to meet specification changes.

WEMCO can also help make your operation more profitable through Total Performance Engineering. If you're planning a new plant or modernization, call or write for WEMCO's new Complete Aggregate Plant brochure today.



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Specify Anaconda all Butyl Shovel Cable

This new shovel cable—the toughest in the industry—cuts shovel downtime. Months of torture testing throughout the country have proved it.

It endured the rugged cold of the Mesabi and the punishing heat of Florida's phosphate mines.

It was twisted, kinked, soaked, crushed and run over.

Its new Butyl *jacket* is the reason for this extra durability in the face of the effects of ozone and moisture and extreme physical punishment.

It is especially compounded to combine flexibility at low temperatures with thermal stability at high temperatures.

Here are other construction features which contribute to this cable's unequalled service record:

1. Anaconda's rubber-core grounding conductors offer a cushioning effect which minimizes pinching and wire breaking and offers greater ground contact protection.
2. Special shielding—a combination of copper cross-braided with cotton—eliminates chafing (and makes splicing faster and easier too).
3. Insulation is a special high-grade Butyl that withstands ozone, heat, and moisture.

Check all the features of this job-proved new shovel cable—they add up to extra cable life, less downtime, and dollar savings. Contact Department EFL-1-PQ, Anaconda Wire and Cable Company, 25 Broadway, New York 4, N. Y.

61255

ASK THE MAN FROM

ANACONDA®

ABOUT ALL-BUTYL SHOVEL CABLE

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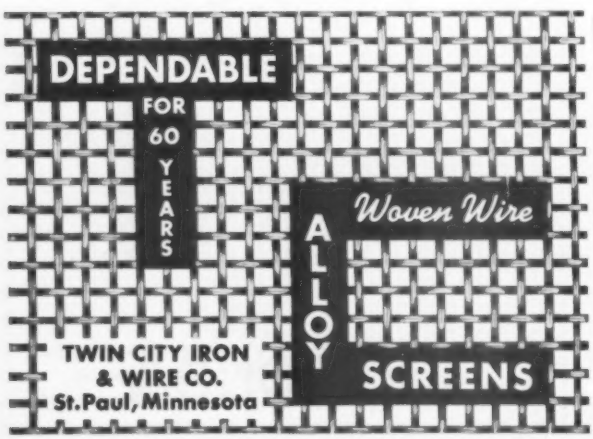

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USED EQUIPMENT?

YOU CAN BUY OR SELL IT BETTER THAN ANYWHERE ELSE IN PIT & QUARRY'S

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The move to Autocar is

no ordinary experience

This extraordinary experience *usually* starts with some hard-headed figuring about the dollars-and-cents payoff. But the day a truck operator takes possession of his Autocar, emotion takes over. His chest swells. Like the man with a new Browning Grade IV shotgun, or a custom-made fly rod, or a Rolls-Royce car, he knows that now he owns the finest. And he knows the respect his new acquisition will command from others. For Autocar says he has arrived!

Why settle for less when nothing takes the place of owning the "World's Finest." Aren't *you* ready to join the Autocar fraternity?

Autocar
"World's Finest"

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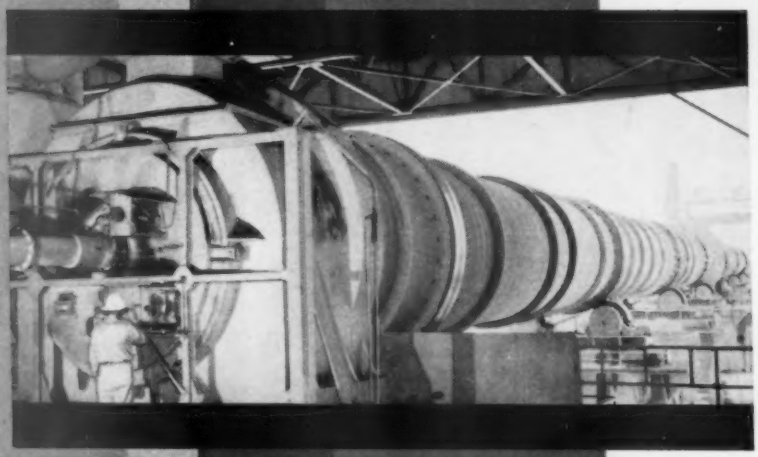
The White Motor Company
Exton, Pa.

TRAYLOR FIRST



Why this 1933 first welded kiln could be the key to your company's profits in the 60's

For the simple well-proved reason that they're better, kilns of all-welded construction are pretty much "standard" today. Important to keep in mind: the standard was set by Traylor . . . builder of the first welded kiln in 1933.

A radical innovation a generation ago —but why so important now? First and obviously, it means that Traylor has the longest record of experience in this special kind of equipment.

More important still: It's merely one example of Traylor's coming up first with new ideas to meet changing needs. Benefits of other Traylor "firsts"—some dating before 1933, many since—are being reaped today throughout the industry, quite likely already including your own plant. Traylor built, for example, the first 60-inch primary gyratory crusher and the first large ball mill.

Today Traylor's proved capacity to pioneer sound innovations in kilns, mills and crushers is enhanced by expanded research capabilities and process know-how.

Up-to-date facilities and a long, impressive record of past "firsts" are a good combination of reasons to call on Traylor first when you're planning for efficient operation in the changing business climate of the sixties.

See Pit and Quarry Handbook for details and specifications.

TRAYLOR ENGINEERING & MANUFACTURING

DIVISION OF FULLER COMPANY

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TKA-15

Here's how centralized lubrication savings soon pay for a Farval system

FARVAL—
Studies in Centralized Lubrication
No. 200

● Interested in a system that produces savings to pay for itself in a few months? And protects your investment in expensive equipment for ten, twenty, or even thirty years or more?

If so, you'll want this new Farval Bulletin 101. It illustrates and describes the application of Farval Centralized Lubrication Systems to a dozen types of equipment—draglines, shovels, crushers, mills, cranes, conveyors and other machinery used in the non-metallic producing and processing industries.

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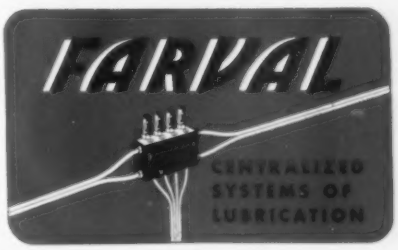
Write for Bulletin 101 today.

Farval Division • Eaton Manufacturing Company
3280 East 80th Street • Cleveland 4, Ohio

Proved in 30 years of service, Farval manual and automatic centralized lubrication systems protect bearings of thousands of machines in industry. Wherever you see the familiar Dualine valve manifolds, dual lubricant lines and central pumping station, you know a machine is being properly lubricated.



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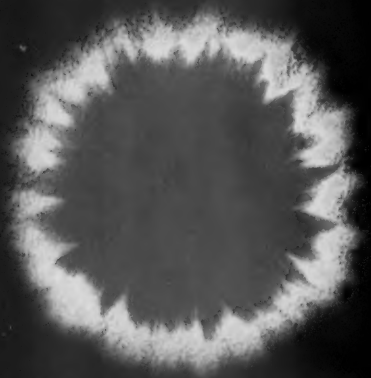
HOT SPOT.



TROUBLE SPOT!

CORHART 104 is the *one* refractory engineered to eliminate costly hot spots in cement kiln hot zones. The tight, interlocking structure of Corhart 104 resists spalling, corrosion, and chemical attack far longer than conventional bonded basic refractories. It attracts and tenaciously clings to a good clinker coating. Modest amounts of Corhart 104 in severe wear areas result in *balanced refractory life* throughout the hot zone, and lower overall refractory cost per ton of clinker. Write for more information: Corhart Refractories Company, Inc., 946 Commonwealth Bldg., Louisville 2, Kentucky.

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